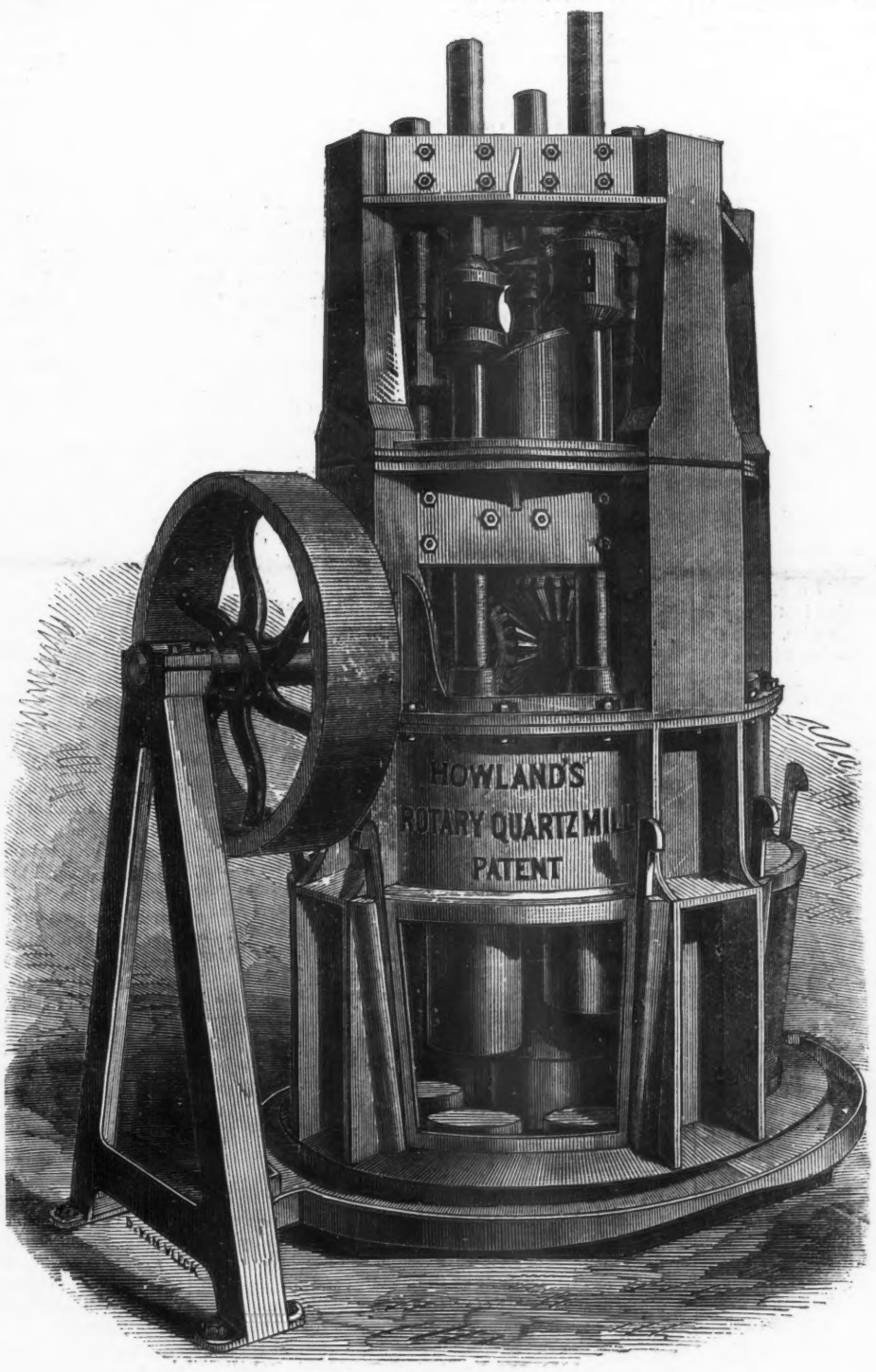
# THE ENGINEERING AND MINING JOURNAL.

VOL. IX.—NO. 2.—THIRD SERIES.] NEW YORK, TUESDAY, JANUARY 11, 1870. [SINGLE COPIES 10 CENTS.


## New Rotary Quartz Mill.

THE idea of the circular battery for stamping rock is not very new. Seven years ago, we believe, Mr. W. H. HOWLAND patented a rotary iron battery, and he is now introducing a new and highly improved form of the same idea, which his prolonged experience has led him to perfect in many important particulars. The accompanying illustration will be sufficient to show to intelligent mill-men, at a glance, the construction of this machine. That it is not a mere fanciful production, unable to stand the tests of actual practice, is sufficiently proved by the record exhibited in favor of the old Howland Rotary Battery, on which this is an improvement. The Gold Hill mill of the Imperial Company, on the Comstock ledge, has five eight-stamp Howland batteries, driven by steam, and crushed, in four years, 43,279 tons of rock, with great success and economy, as is certified by the superintendent of that company, who says that the annual report shows quite a percentage of saving in favor of the Gold Hill mill, over the other mill of the company, the Rock Point, which has eighty stamps, propelled by water power.

The San Francisco *Herald*, alluding to this subject, justly remarks: "The experience of Nevada is all in favor of medium works, with the simplest possible construction compatible with effectiveness. The Gould and Curry mill, and its adjuncts, it has been stated, cost one million of dollars, and the passer-by, instead of hearing the clatter of the stamps, is surprised at the solitude and lack of bustle that once gave life to the place. In contrast to this, in passing up Gold Hill from the Devil's Gate, there is a little, dumpy, rickety old mill, one of the first erected in Washoe, that is always pounding away, and is frequently pointed out to strangers as one of the best paying institutions of the country, compared with first cost and expense of running. This pocket mill consists of a Howland Rotary Battery, driven by steam power. These lessons are particularly valuable just now, when mining is taking a new and healthy lease of life, and when the rich districts of the White Pine country are making demands for more mills, that they may show the world the amount of treasure they are capable of producing. There have been built a score of mills throughout Nevada, that ultimately were taken down and removed, from causes that, had the operations of the companies been properly conducted, would have been apparent, and saved the cost of erecting machinery. These mills are composed of many parts, with much wood in their construction, which is nearly or quite ruined in taking apart, thus entailing a heavy loss on the owners."




The advantage of the new Howland Battery over the old ones alluded to as running at Virginia, is the employment of more metal in the mortar or base, and the prevention of the leakage at the base of the column, the jarring and loosening of bolts, and the wear of guide-boxes—evils which were formerly subjects of complaint from those who used this mill.

As compared with the best straight batteries with wooden frame, the advantages claimed for the Howland Rotary Batteries are greater cheapness and lightness, greater ease of suction; superior effectiveness with less power; and the impossibility of leakage or waste of amalgam.

An eight-stamp mill, complete, weighs 12,000 pounds, and costs $1,800 dollars; is calculated to run, with 600 pound stamps at the rate of 100 drops per minute, and to crush, when working up to full capacity, from 12 to 16 tons in twenty-four hours.

A twelve-stamp mill, complete, weighs 18,000 pounds, and costs $2,800. These batteries are cast in three sections. The first comprises the mortar or base, screen frames, and feed openings in one piece; the second, the lower guide-boxes, (which are of wood), driving-gears, and cam wheel; the third, or upper section, contains the upper guide-boxes. These three sections are bolted together, with thin pieces of wood packing between each.

The stems, tappets, stamps, shoes, and dies are the same as in the ordinary cast straight batteries.

Mr. HOWLAND, the inventor of this battery, has long been known to the mining community as one of the proprietors of the celebrated "Miners' Foundry" at San Francisco. He is now established in the city of New York, and has, we believe, completed a business arrangement with the well-known house of MOREY & SPERRY, No. 95 Liberty street, to whom inquiries or applications on the subject of the Rotary Battery may be addressed.

## East River Improvements—A New Canal Basin.

THE wealthy grain and flour dealers of this city have at present a very important project in view in regard to the improvement of certain docks and slips lying on the East river at the southern extremity of the island, which, if carried out, and there is flattering prospects, promises to be a great benefit, not only to the city, but to be of vas importance to the shipping interest of the country.

The proposed improvement referred to will consist in the entire demolishment of the rotten wharves and piers, below Wall street, as far down as pier No. 1, and the building, in their stead, of an immense canal basin, for the benefit of the flour and grain trade, which has for years centred in that locality. There have been several meetings of the projectors of the scheme, and a joint stock company has been formed, with a capital subscribed, so far, of a little over $300,000, and as soon as arrangements can be effected with a number of property owners fronting the proposed work, operations will be commenced.

The new basin is designed to be a model of its kind, not only in massiveness, but in workmanship, and when completed, which will require more than two years' time from its beginning, will, in magnitude, compare favorably with the great grain basin at Odessa, on the Black Sea, which accommodates about 30,000 barges.

It will embrace the same water frontage as formerly, but the projecting piers will be removed, the bottom dredged so as to accommodate boats heavily laden both during high and low tide. Beginning at pier No. 1, immediately adjoining the Hamilton ferry-house, excavations will be made for the granite wall during the coming month, which will extend up the river as far as pier No. 5, where a mole or jetty will project out into the river a distance of some two or three hundred feet. In the meantime, negotiations will be pending between the owners of wharfage grounds between pier No. 5 and the foot of Wall street and the company, for the further extension of the basin, which will doubtless prove successful, as other shipping firms on South street have signified their willingness to co-operate with the new company in making the wharves and piers of the East river at least a credit to the city in comparison to the wooden structures.

The new basin is designed to accommodate at least three times the number of boats that the slips accommodate, which will also have a tendency to draw off the grain trade of Horsimus Cove, in Jersey City, where hundreds of grain barges lie up during the winter months, during low tide, floundering in the mud, which dampens and destroys thousands of bushels of grain before removal.

An enormous elevator, to be composed entirely of iron and slate, will be built at the upper extremity of the basin, which will surpass even the great elevators of Chicago and Buffalo. Its estimated cost will be $200,000. The elevator is designed to be of a sufficient height to discharge grain from barges into ships of the largest class, which will be quite an improvement upon the old style.

The engineer of this important work is General EGBERT L. VIELE, who has made all of the surveys, which are deemed highly satisfactory. General VIELE has gained a reputation as an accomplished and scientific engineer, second to none in the United States, as his plans and work on the Central Park, the

Paterson waterworks, and the Battery sea wall will attest; and the new basin, under his superintendence, will, when finished, undoubtedly prove a success, as well as being an incentive to our city authorities and wealthy men to commence the construction of docks and piers of granite instead of wood.

It has not been definitely settled as yet when work will be undertaken on the basin, but the managers expect to get the work under way by the middle or last of the coming month, provided the earth is in a condition to excavate.

## The United States Mining Law.

LETTER FROM HON. E. F. DUNNE.

R. W. RAYMOND, ESQ., U. S. COMMISSIONER, ETC.:

DEAR SIR—My first letter closed with the consideration of the first objection to the present mining law. I propose to continue the subject in the order there indicated; and shall be able to complete the suggestions I have at your request prepared, in this and one subsequent letter.

SECOND.

*Objection.* Allowing piratical locations to be made in the immediate vicinity of *bona fide* claims.

*Remedy Suggested.* That no younger location made within two hundred and fifty feet of the central line of an older location shall be patentable.

*Comments.* There is no objection to enforcing this principle after parties have had notice that such claims, if made, will be illegal. The amendments under title first cover the ground on this point from and after the first Monday in July, 1870, because under those provisions no such cases can arise after that date.

But if it be sought to apply the remedy suggested for objection second to existing claims, it would meet with great opposition. It would be looked upon as a virtual confiscation of such younger claims for the simple purpose of insuring a technical uniformity in the law, and be anathematized on every side as an infamous procrustean policy. Most of these younger locations have done nothing which merits any condemnation, and the mass of them should not be summarily deprived of life because the liberty which permitted their creation was sometimes abused for piratical purposes. Younger locations are often more meritorious than older ones adjoining. It must be remembered that all valid existing locations have been made under local laws governing the case, and that their relative merits should be determined not by any new standard now erected, but by the laws which permitted their creation. Examining the matter under the light of those laws, we find the process to be as follows: An old location is made at a certain point. The laws of the district limited the owner to, say fifty feet on each side of his location. One day, or five years after, some one finds a vein within one hundred feet of that claim and locates and works it, there being no question whatever of any intrusion on the rights of the older location near by. As time rolls along, the old location, in hundreds of cases, does nothing upon its ground save slight scratching in the way of assessment work, sufficient to keep the title alive, while the younger location, near by, is worked and developed into a valuable mine. In this case it would work a great injustice to refuse to recognize the younger claim as patentable. It does not answer the objection to say that the proposed remedy does not interfere between the local rights of the claims, that the younger location may continue to work under the district laws if it likes, but shall simply not be patentable; that we merely wish to bring a little gentle pressure upon it to induce it to arrange with the older location so that both may apply for a patent jointly, because this is playing into the hands of the old location in an unfair manner, and bestowing upon it a value, by giving it command of the situation, which it has in many cases done nothing whatever to merit. But it may be said with great truth this is only one side of the picture. There are many cases where all the equities are on the other side; where the younger location from the very first was intended, and ever since has continued, to be a regular black-mailing operation, a combination of chicanery knavery and fraud from beginning to end. Shall nothing be done with such piratical locations? Well, it is very difficult to punish past offences by legislative enactment without doing more harm than good. The adoption of the amendments suggested in title first would settle this question for all time after the first Monday of July, 1870, without harming any one, and that would be a great point gained. As to the past, I do not see that we can do anything in this respect except to let the laws of political economy govern. The action of these laws is somewhat slow, it must be confessed, but the great certainty achieved atones for delay. They will satisfactorily settle the question, if obstacles in the way of their operation be removed, sooner, I think, than any other means that can be devised. Let us notice for a moment how they will act, and then we may the better judge of their efficiency. Given, one of the worst of cases: a district where the locations are all tangled up, lying at all distances less than two hundred feet from each other; how can it be straightened out and patents issued? Let us first classify the claims. They easily arrange themselves into three grades:

1. *Bona fide*, valuable locations.
2. *Bona fide* locations of doubtful value.
3. Mere piratical locations and worthless claims.

Permit patents to issue to all owners who desire them, granting to each just such an amount as the laws of the district permit, not exceeding 3,000 feet in length on the vein. There will be no necessity of restricting the width, because the case is one where the full width allowed cannot be obtained; but determine the width by ordaining that each applicant for a patent shall take the ground half-way to his nearest neighbor, with permission to each patentee to have his patent extended on either side of his centre line to the full extent of two hundred and fifty feet, or less, whenever he can show title thereto, whether by ousting his neighbors by ejectment or extinguishing their title by purchase. This would soon weed out the piratical locations, and gradually extinguish the worthless claims. Piratical locations are made only on valuable claims. They are soon extinguished, because their own excavations in pursuit of mineral are of course directed toward the main deposit. The owners of the main deposit run a drift night and day to meet them. The moment the connection is made the question is settled, and the pirates are ousted. If there is danger of their extracting too much mineral before the connection can be made, and the *bona fide* owners make a reasonable showing of facts, the courts are very liberal in granting injunctions against evident trespassers, until the owners have time to "trace them out"—that is, to extend their works in the direction of the trespass complained of, and prove an identity of deposit. There is no difficulty experienced in practice from the pirates trying to turn the tables, and enjoining the *bona fide* owners, because very large and perfectly satisfactory bonds are exacted by the judge before granting the order; a condition which the free lances find it very difficult to comply with.

So much for the manner of settling piratical locations. It is tedious, expensive, and annoying, but it is very effective, and, in my opinion, is the only one which can be used without doing great damage by seriously trespassing on the rights of others. It is not the cases in hand which worry the *bona fide* owners. It is the chronic fear that new cases may be sprung upon them at any moment by any ingenious, adroit, unscrupulous rogue, who, by falsification of the record, tampering with testimony, or personal perjury, chooses to put their property in peril. Fix a time when this fear may confidently cease, and they will take care of all present difficulties.

The worthless claims are easily disposed of. Give a man the right to extend his patent over them after purchase, and he will buy them up by the dozen, if necessary, and extinguish them.

Now, as to the difficulty of weeding out claims of the second class—namely, locations which, though made in good faith, are not of sufficient value to command the attention of capital at present, and yet are too promising to be abandoned. The owners of this class of claims rarely apply for patents. The doing of a thousand dollars' worth of work to begin with is a very serious damper on them. Then to have that followed by the delay, annoyance, and expense of endeavoring to procure a patent, with the prospect of litigation with contesting claims as an interlude, makes it a serious question to them whether the operation will pay or not. They generally conclude that it won't, and allow their claims to drag on a miserable existence from year to year. The mere doing of twenty days' work per year, hereinafter suggested, would extinguish most of these claims. Now, if the owner of a valuable mine near by could readily get his lines extended by purchasing this claim, he would easily make some terms with the owner for his title, and include it in his own area. It is not worth patenting by itself, but to the adjoining owner it is often worth purchasing to get it out of the way, avoid the possibility of further difficulty with it, and to straighten his lines.

This quickly sweeps away the great mass of the claims, those included in the second and third divisions, namely, *bona fide* locations of doubtful value, and mere piratical and worthless claims. There remain only cases of the first class, *bona fide* locations of undoubted value, which are too near each other to allow of two hundred and fifty feet on each side, and yet each desirous of maintaining its location, working its mine and getting its patent. They have all been busily engaged in this clearing up process, and are now able, for the first time, to look about them and scan one another's lines, with nothing to obstruct their vision. Almost of necessity the lines have been closed and no vacant spaces left, for these owners remain the sole survivors of all the titles that formerly existed in the area given. If, however, any unappropriated area still remains, divide it equally between adjoining owners. Then, if each company is strong enough to work its own property, there is nothing in the way. All of this is effected without any harsh or oppressive enactment. No one has been unjustly deprived of any right to which he was legally entitled. All has been voluntary, and of course measurably satisfactory.

I am inclined to think that an additional feature might be added, for the benefit of regions where the veins lie very close and cross and recross, and are confused by slides, heaves and breaks, so that it is impossible to say where the vein is and where it is not, and that would be the privilege of consolidation; that is to say, that where a condition of things exists which would permit the issuance of six patents, side by side, of three thousand or less feet in length, and five hundred feet in width, or twelve patents of two hundred and fifty feet each in width, or any number of patents of any width, that the parties entitled to receive those patents separately, might unite in their application and receive one patent to a consolidated company, for the whole or any part of an area not exceeding three thousand feet square. These consolidations would be effected oftener than would probably be supposed. There is great difficulty in getting capital to work small isolated veins. The organization of companies is expensive. The cost of maintaining a competent mining superintendence, together with the clerical force necessary to keep the accounts of a joint-stock company, is very large, and generally greatly in disproportion to the expense actually incurred for labor in the mine. There are often a dozen small veins within an area of three thousand feet square, not one of which will, of itself, support an independent organization to work it, with a board of trustees and secretary in New York, and a superintendent travelling back and forth, from the board to the mine, but which, if consolidated under one management, would be highly remunerative. This forming of big companies on small veins is the cause of so many mining failures. The mine has, in hundreds of instances, paid well on all the labor actually expended on the mine itself, and a margin which would cover the cost of reasonable management; but it has not been able to support, in addition to that, a fancy superintendent, with his fancy concomitants, a staff of clerks and a board, secretary and officers in New York, Boston, or Philadelphia. Throw a dozen of these small veins into one consolidation, so that one patent may be issued for the whole area and the property be worked by one organization, and such a company can succeed, and capital will easily be found to engage in such enterprises. Some may say there is nothing to prevent this consolidation being effected now, if parties are so inclined. Such persons do not understand the whole case. There is no legal restriction, it is true; but there is an economical one, which is equally potent, and that is the great accumulation of expense in procuring separate patents for all of these veins. If the owners get beyond the pecuniary difficulty of obtaining patents, then the temptation to sell separately is too great to be resisted.

When the sales have been made and the companies organized, it is useless to hope for consolidation. The officers of each company prefer to "keep the ball a-rolling," and the scattered stockholders, residents of cities far distant from the mines, know but little of the comparative merits of each claim, but are prejudiced in favor of their own, and therefore look with distrust on consolidation, fearing that they will not get a fair division of the new capital stock. But there is one place where consolidation is possible, and that is upon the ground itself before patent issues. The owners are there to see for themselves. They know well the relative value of the different claims. They can see at a glance all the advantages and disadvantages of the different locations, examine the questions of title which enhance or reduce the value of a claim, and fully understand when a consolidation would be beneficial by reason of the opportunities thereby afforded to work several mines from the same shaft or tunnel. As a general rule, they are all in need of money, and anxious to sell. There is here the knowledge necessary to form an equitable consolidation, where the shares to be issued to each owner in the new company can be fairly divided in proportion to the relative value of each claim contributed to the general stock. There is also the motive of interest necessary to prompt such action. Let the law but sanction and encourage it by granting a patent for the whole consolidation, and there will soon be properties open for investments at prices to which no exception can be taken, and offering advantages to capital very rarely presented under the present system of patenting and selling each vein separately, no matter how diminutive in extent, or insignificant in value, such vein may be.

AMENDMENTS PROPOSED UNDER THIS TITLE.

*Sec.* When a width of five hundred feet cannot be granted to a claimant, by reason of the proximity of other locations, the patent shall cover the land half-way to the nearest existing valid location.

*Sec.* Any patent granted for a less area than the maximum allowed may be extended to said maximum area, or as near thereto as may be asked, by some cheap and speedy means to be indicated by the Commissioner, whenever it shall appear that the person seeking such extension is the owner of, and in the possession of, the area covered by the patent already issued, and is also the owner of, and in the possession of, the additional area claimed.

*Sec.* Veins and deposits, any portion of whose longitudinal centre lines are not more than five hundred feet distant from each other, may be associated, and one patent issued to include them all, provided no such patent shall cover an area greater than an area equal to three thousand feet square.

*Sec.* When fractions less than five hundred feet in length occur upon a vein, or less than five hundred feet square on a deposit, they may be included in the patent of an adjoining owner, in addition to the area he might otherwise receive, when it shall appear that such adjoining owner is also the owner of such fraction, or is first in application therefor.

THIRD.

*Objection.* Permitting later locations, within two hundred and fifty feet of the centre of an old location, to prevent the lateral extension of such old claim to the maximum width allowed.

*Remedy suggested.* The third recommendation in your report is directed to this objection, but the case is covered by amendments set forth under title second.

FOURTH.

*Objection.* Restricting the patent to one vein, and not allowing the patentee to purchase new veins found in his area without the formality and expense of a new patent.

*Remedy suggested.* That the patentee of any certain area shall have the right to purchase all veins owned by him in said area by paying, in addition to the usual fee of $5 per acre, the sum of $10 for each separate vein discovered and worked within his tract besides the one upon which the issuance of the patent is based.

*Comments.* The principle on which this recommendation is based, namely, that a patentee ought to be allowed to own all the veins in his tract is most important, and the adoption of it, I believe, is universally desired by all persons engaged in legitimate mining, but I think the form of applying it might be made more satisfactory than that suggested. The recommendation cited would work well enough for all the veins discovered and worked at the time the application for the patent is made. Such veins could then be easily designated in the application, and the ten dollars a piece included in the general payment made at that time, and there would be an end of it. But, thousands of veins will be disovered in the course of mining operations after patents will have been issued. It would be a great annoyance to be making application for the purchase of each vein, as discovered, and the charge of ten dollars for the purchase money would be but a very small part

of the expense which the person seeking to become the owner of such vein would have to bear. The trouble and expense would vary but little from the cost of an original patent. Now if the principle be omitted that the patentee of a tract ought to have all the veins contained within it, so that he can enjoy his possession in peace, why not give them to him at once and be done with it. The miners want it. The only question is, will the government be wise and just enough to grant it? Now the government in this matter is simply the people at large. When the miners ask this concession they are not petitioning an absolute monarch who holds these treasures as a private fund from which to recruit his fortunes, and who would look with a jealous eye on any attempt to curtail his perquisites, but they are consulting with fellow-citizens about a property which is owned in common. The naked title to these mines belongs to the whole people, north, south, east and west, but that title of itself alone, exclusive of the labor expended upon the property, was of little value. While this title was thus of comparatively little moment, a vast number of our people, an invading army of pioneers, went out into this new country and conquered it, undergoing as great danger and hardship as the pioneers of our former West. By withdrawing their labor from the comparatively over-crowded regions of the older States they opened a wider field of industry for those who remained at home. They went out and drew the supplies necessary to their existence from new sources, and so made life easier for those left behind. In their twenty years of effort they have made great conquests for the nation. In the region which so recently was almost unknown to the East they have given us California, Oregon, Washington, Arizona, Nevada, Idaho, Wyoming, New Mexico, Montana, Colorado, and Dakota, nearly half the area of the whole country. They have opened up and established a new and peculiar interest which requires new and peculiar legislation for its regulation. When they ask for this necessary assistance they are entitled to have their request considered in the most kindly and generous manner by the inhabitants of the older settled portions of the country.

There is often a disposition on the part of the latter to look at this question entirely in the light of their own particular interest, and to dispose of it as if the title to the mines belonged exclusively to them, to be doled out to the inhabitants of the mining regions in such way as will secure the immediate payment of the largest amount of ready cash, forgetting that after all they represent but little more than one-half the area of the country, and that, although when the people at large meet in council, they may be able to outvote the mining interest, they ought, nevertheless, approach all legislation on this subject with the greatest caution. The interests involved, and the area affected by action on this matter, are so great that no legislation should be pushed which does not meet with a pretty general approval from those most directly concerned. So far as legislation has progressed, the miners are and have reason to be grateful. Every step taken has been in the right direction. All they ask now is a more extensive application of the liberal policy adopted. The particular extension herein asked is, that the patent shall carry with it all the mineral contained in the area granted; that that area may be three thousand feet long by five hundred feet wide, and that parties side by side may consolidate before application, and have one patent to cover all their ground, not exceeding three thousand feet square. If any one is startled at the size of these tracts, let him figure on the size of the tracts and see whether any one is likely to take them up at five dollars per acre for merely speculative purposes. Something must be done to make this patent system work. Hardly any one applies for a patent now, and the only reason why they do not, is on account of the infinitesimal area practically granted by reason of the restriction to a single vein. Ninety-nine hundredths of the mines which want the benefits of the law are not sufficiently developed to enable the owner to say with safety which body of mineral in his location is the vein. He cannot tell whether there is one, two, three, or more veins in the area allowed him by the law of the district, and, granting that in some cases he may be able to say with certainty that there are three veins in such area, he cannot tell which is the most valuable one, and he is not going to be foolish enough to clap his stakes, hap-hazard, on one vein and abandon the others. If you answer, let him keep up the title to the others under the district laws, he replies, "If I must do that with one or more of my veins, I may as well do it with all of them. I don't want to bother my head with two systems at the same time, when one of them covers the case, although imperfectly, while the other, though more satisfactory as far as it goes, does not go far enough to enable me to abandon the first."

Now, I know one case where a company owning four lines of croppings has expended one hundred and fifty thousand dollars, gold, within an area of five hundred feet square, and yet it dare not apply for a patent, though exceedingly anxious to obtain one, because it dare not say upon which line of croppings it will rely to conduct it to the main vein. The consequence is, that in this case, and there are a thousand such in greater or less degree, the present law, so far as patents are concerned, is of no benefit whatever, but is only a tantalizing source of annoyance. An ordinary owner in such condition can do nothing whatever. He can't sell his mine, neither can he work it. He can't work it, because it takes too much money. He can't sell it, even if he takes out a patent under the present law. Moneyed men say to him, "How do we know that this vein which you have named in your patent is the true one? It may be only a spur or a lateral outcrop. If it be either of these, the law does not permit you to connect yourself with the main vein. It may be a slide—if so, there is litigation before we can shift our title back to the vein." But the case would be different if a miner could present a patent for an area three thousand feet long and five hundred feet wide, with mineral cropping out in various parts of it. Then he could say, we think the vein is here or that it is there; but at all events, it is somewhere in this area, and wherever it is, we take it. Then, again, within an area of five hundred feet in width there are often four or five little veins, not one of which will pay to work separately, but each one of which carries within its location the seeds of abundant litigation, should anything valuable near by be discovered. This amendment would generally consolidate such claims and end disputes.

But why is there any objection made to such reasonable provisions as these? Simply because of the existence of a most erroneous impression with regard to the value of the veins. It is quite a common expression in governmental circles, that one vein is as much as any one company ought to own. Those who gravely assert this proposition would be astonished to see how it excites the risibility of prospectors who are in the vein business, and who often, in their tramps, find veins which are not worth the trouble of merely locating, under the loose system of district laws. A vein, although it may be a true-fissure, silver-bearing quartz lode, is a thing of most variable value. Though it may have all the characteristics of a true vein, it may not be big enough, or rich enough, or anything else enough, to pay for working, and then what value has it? If all veins were of the same size, and worth just a million dollars apiece, there would be some sense in saying that one vein is as much as one company ought to own; but as such is, unhappily, not the case, the wisdom of such an observation is not so startlingly apparent. Fears are entertained that, unless the area granted is made exceedingly small, gigantic mining monopolies may be created, which will disturb the economy of society, overturn all social order, and sacrifice the people upon the altar of the Plutonian god. But is there much prospect that we will find anywhere, in an area three thousand feet long by five hundred feet wide, a body of ore more valuable than the best of the claims on the Comstock? No such location exists anywhere now in the United States, or the whole country would be in a blaze about it. Is there any hope of ever discovering anything richer than the White Pine deposits, where ore is found worth $20,000 a ton? Yet, right in the heart of the richest portion of Treasure Hill, the Consolidated Chloride Flat Company owns an area as great, I think, as that proposed. Yet no one complains of that company as a monopoly. The people in that vicinity would throw up their hats with delight, if the body of ore in that location were suddenly doubled in quantity and trebled in value, for the community would benefit by it more than the owners. People are too apt to forget that even the most successful mining companies are compelled to pay back to their workmen seventy, eighty, or ninety cents out of every dollar's worth of bullion they get from the mine. Another point in this case is, that the companies always have to pay this money out first, and many of them never get the dollar back.

The attempt of the present patent law, to prevent great mining monopolies by granting but one vein, is not worthy of great commendation, because, first, there is no danger that any company will ever find too many veins in a space of five hundred feet in breadth, and, second, because, even under this law, any company that chooses, can own as many mines as it wishes, simply by paying the cost of a patent for each one discovered by it within its area, or purchased from original locators. But the rich companies don't care for patents under the present system, unless in the exceptional cases where the mine is fully developed, and the existence of but one vein satisfactorily proven.

The great object of legislation on this subject should be to encourage mining, and the way to do that is, to put things in such shape that people will feel they can get large returns by engaging in that branch of industry. They cannot be content with a prospect of common profits, because they are compelled to take uncommon risks, and they need therefore the inducement of a great reward. There need not be much fear of giant monopolies. Only the ordinary mines will be consolidated. The best ones will stand on their own organization. Common carriers—railroad, steamboat and express companies—by consolidation can raise their receipts to almost any figures they choose; but no matter how much mining companies may combine, the market price of their bullion product will still be the same. The only benefit they can derive by consolidation—namely, a reduction of the cost of production, by diminishing officers' salaries and directing labor to better advantage—is one that the government should seek to aid rather than prevent. If there is any lawful means by which the government can discourage the formation of the innumerable wild-cat mining corporations, which impoverish the unwary and bring such discredit on the whole business of mining, it ought to be adopted. Some time ago, the government, by skillful legislation, exterminated the wild-cat banks of the country, and built up corporative monopolies in their place, and the people approved, because of the greater security afforded for investment. A somewhat similar policy with regard to mining will be even more cordially sanctioned. The complaint now made is that the last clause of Section 3 of the Act, limits the issuance of a patent to one vein in a tract. It can be removed by the following

*Amendment.*—Strike out the last clause of Section 3 of the Act, which limits the patent to one vein, and insert instead the words: "The patent for any area shall carry with it all the right, title and interest of the United States to any and all minerals contained within the space granted, with the right to follow vein deposits to any depth, although they may enter the land adjoining."

Remaining objections and remarks thereupon, will occupy another and final communication.

E. F. DUNNE.

## The United States and Asia.

From the Report of Hon. Jos. S. WILSON, Commissioner of the United States General Land Office, for 1868.

OUR special advantage in controlling the trade of Asia lies in our mineral wealth. In twenty years we have probably added to the metallic circulating medium of the world about $1,250,000,000, ten per cent. of which is silver. Of the world's annual product, about $200,000,000, we are producing more than one-half. It is true the decline of placer mining has been more rapid than the expansion of vein mining, and that consequently our aggregate annual production has diminished, yet this is no ground of apprehension to minds conversant with the subject. We are now recovering from the lethargy that followed the reckless speculations in the mining regions. Costly experience has been fruitful in lessons of practical wisdom, and in specific facts in regard to our mining resources. Schools of mining are being established, combining the accumulated science and skill of Europe with the ready tact and restlessness of American mind, and promising a greatly enhanced metallic production in the coming age of mining enterprise.

The practical results of the important facts suggested are beginning to be developed in a remarkable degree, and can only be fully appreciated in connection with some peculiar characteristics of Oriental society which have perplexed political economists from the days of Pliny to the present.

The industrial organization of eastern nations has secured, from time immemorial, heavy balances of trade in their favor, resulting from the inexpensive habits of their laboring population. The average wages of labor in Bengal do not exceed from three to three and a-half pence per day, the average in southern and eastern Asiatic countries being about the same. When rice does not cost more than a halfpenny per pound, this sum represents the full share of animal comfort that is requisite to meet the limited aspirations of these down-trodden masses, and to maintain their effective laboring strength. Such labor is found inefficient when compared with the muscular force of civilized men; yet, after meeting all home demands, it secures a very large annual surplus for exportation. This export is not balanced by any commensurate import to meet the most lavish expenses of the small ruling class, to whose wants the demand for foreign productions is limited, the mere physical necessities of the masses being satisfied with the fruits of the soil. On the other hand, the staple exports of such countries—tea, silk, coffee, cotton, and spices—have, through the settled habits of civilized life, become articles of imperious necessity. Reciprocity of supply and demand, then, having but a limited application to the trade with Oriental nations, these balances must be paid in the precious metals, mostly silver. From this has resulted that puzzled financial problem, "the drain of specie to the east." From the time Pliny estimated the annual export of precious metals to the east at a sum equal to $4,000,000 for luxuries and female ornaments, this drain has continued, with occasional fluctuations, yet with general expansion, to the present time. If it had not enlarged beyond the estimate of Pliny, it would by this time have accumulated not less than $8,000,000,000 in Asiatic countries—a sum equal to double the national debt of England, and exceeding many times the entire stock of precious metals, both in Europe and America. But the gradual enlargement of this export for hundreds of years, and especially its enormous expansion since 1853, renders the conditions of the problem unmanageable, and its results indeterminate.

In volume thirty-nine of the British Parliamentary Papers for 1866 is found a report of the Bengal Chamber of Commerce, urging the adoption of gold currency, as the annual absorption of silver by India is greater than the world's entire production. The Bombay Chamber of Commerce, estimating the world's annual silver product at £10,000,000, stated that for the previous six years India had absorbed an average of £11,500,000, and during the year immediately previous £14,500,000, or from 15 to nearly 50 per cent. in excess of the annual product of the globe. Individual estimates are also given, slightly varying from the above, which are endorsed by the governor of Bombay. Dr. Nassau Lees, in his "Drain of Specie to the East," estimates that this drain will, from the necessities of local traffic alone, engulf some four or five hundred millions more of the world's silver, while other authorities estimate India's absorbent power as practically unlimited.

From these and other facts, it will be seen that the increase of trade with Asia involves an increased draught upon the world's stock of silver. What is especially remarkable, is the fact that Asiatic countries have so little to show by way of accumulation. In 1857, India had a circulation of $400,000,000 among a population of 180,000,000, or about $2.22 per capita; China and Japan have about $3 per capita; while France, with a population of 38,000,000, has a metallic circulation of $910,000,000, or $24 per capita. Yet western nations are still pouring their uncounted millions into this apparently fathomless abyss.

During 1866, European exports of specie to Asia amounted to $58,000,000, of which $56,250,000 were silver. The exports of the previous fourteen years amounted to $911,000,000, of which $787,000,000 were silver. Without attempting to account for this phenomenon upon any of the theories propounded by different writers, attention is invited to the elements of power which our enormous production of gold and silver gives us in meeting this demand. During the year 1866, our direct shipments of treasure from San Francisco to Asia amounted to $6,633,418, being an excess of $101,211 over the shipment to England, seven times greater than the shipment to France, and nearly one-fifth of the shipment to New York. The president of the San Francisco Chamber of Commerce, in a report made in 1867, shows by facts and figures that the cost of laying down silver in China from San Francisco direct, in sailing vessels, is

less than one-half the cost of sending it by way of London, the freight and primage being in the latter case more than double the former, and saddled with a double insurance, besides commissions.

The establishment of the China branch of the Pacific Mail Steamship Company has since enlarged the facilities of a prompt and safe transmission of treasure. It is not easy to estimate the full force of our advantage thus accruing in controlling the commerce of eastern Asia. The ultimate result cannot fail, as heretofore suggested, to be the establishment at San Francisco and New York of clearing-houses for the commerce of the globe.

The rapid and radical changes lately wrought in the relations of the different Asiatic powers present favorable opportunities for the extension of the commercial influence of the Union. The maps of that continent promise speedy reconstruction. The Eastern question of the last and present century has broadened its issues, and is involving world-wide interests in its solution. The Czar is becoming essentially an Asiatic potentate, and the drift of Russian civilization is eastward, to meet and join hands with our own across the Pacific. The laborious efforts of the Russian government to elevate its masses will be far more effective when once it shifts its capital towards the Pacific, which is soon to be the grand arena of commerce and industry.

England has also become an Asiatic power; leaving the Gallic and Germanic fragments of the Carlovingian Empire to struggle for the mastery of continental Europe, she stakes her power, perhaps her national existence, upon the stability of her Indian empire. Russia, having swept across the Kirguis steppe and conquered three-fourths of Turkestan, now holds a commanding position towards the Anglo-Indian frontier, which has been pushed across the Indus, absorbing Scinde and Punjaub, and now rests upon the summit of the Hindoo Koosh. Its right flank is further protected by a diplomatic ascendency over Thibet and Cashmere, which, by degrees, may pass into territorial sovereignty. Both parties are now struggling for the diplomatic control of the whole Iranian plateau.

Looking to eventualities, England has an army in India of 150,000 troops, of whom 70,000 are English; yet her main hope is in the reconstruction of Indian civilization, and in the consolidation of her empire by the construction of a magnificent system of railroads, involving an expenditure of $44,000,000. These are arranged with rare strategic skill, quadrupling the efficiency of her military force by multiplied facilities for concentration. Civilization is radiated downward, through strata of ignorance and superstition, the whole forming a unique political and social organism, the greatest colonial empire of history. It is scarcely concealed by British publicists that the main object of British rule is to transform Hindostan into a market for her manufactures, thereby drawing new aliment to her home industry. France has again entered the field of Asiatic colonial enterprise, and is already pressing the soil of Farther India, evidently with the good will of her English neighbors.

The Russians, in addition to their conquests in Turkestan, have advanced their Siberian frontier southward, at the expense of China. First the entire left bank of the Amoor was secured during the Taeping rebellion. Subsequently, Russia pushed her line southward, through Mantchooria, to the borders of Corea, within 800 miles of Pekin.

Amidst the complications of internal discord and external hostility in China, the military prestige of this republic loomed across the Pacific, developing a new and commanding interest in Asiatic affairs. A new line of policy has been adopted by the statesmen of the Celestial Empire, being nothing less than an abandonment of the isolation of forty centuries, the empire taking its place in the family of nations, and assuming the obligations and sharing the benefits of international comity

The United States have ever recognized the sentiment of the brotherhood of mankind as the basis not only of our domestic institutions, but of our foreign policy, not looking beyond our immediate continental relations, and having no motive for aggression. This general idea of our national character has been confirmed by our intercourse with the Chinese government, and our commercial transactions with their people. Under the auspices of America, China now seeks to secure position among the nations of the earth, and to escape the fate of other Oriental states. This involves the reconstruction of her civilization, and the introduction of those improvements of science and art which have enabled European nations to dominate the immensely more populous regions of Asia. She desires now to introduce the latest processes of art without impairing the industry of her people; to increase facilities for manufacturing, agricultural, and mining enterprise, as the basis of a more extended and mutually profitable foreign and domestic commerce.

To enable the Chinese to realize such results, by assisting them in avoiding the complications of European diplomacy, in affording adequate moral support against ambitious schemes of foreign conquest, but above all in striking the key note of nobler social organization and individual manhood, this country will render a service that will add to the American name a glory not eclipsed by past achievements in civilization. Our claims to the regard of that people will of course unlock to us the doors of a more intimate commercial intercourse than has yet been accorded to any nation, an advantage not lessened by recollections of any injustice or aggression.

Through an established trading intercourse with China, exerting a powerful influence on her internal as well as her external trade, the commercial interests of America will gain permanent footing. The railroads which will soon intersect the Celestial Empire will act as feeders to our American Pacific steam fleet. These railways will reach the tribes of the interior, and develop commercial relations with people yet but partially known. Our steamers upon the Yang-tze-kiang, the Hoang-ho, and the Hoang-kiang, will bring down the products of Chinese industry, and in return carry to the furthest point of navigation cargoes of American mechanical, agricultural, and mining products, thus diffusing the blessings of a varied industry and an enriching commerce, not controlled by military conquest and colonial empire, but by the regular normal influences of fair dealing and intelligent enterprise.

## Carbonic Acid Gas, the Fire Extinguisher.

BY DR. L. FEUCHTWANGER.

THE great disasters which have happened of late in the coal mines of Pennsylvania, Germany and England, ought, while fresh in our minds, to stimulate mining engineers to invent an apparatus for properly ventilating coal mines and preventing the explosions from coal-damps. The expense of producing carbonic acid is but trifling; and as soon as there are indications of a fire breaking out, the carbonic acid gas may be admitted in such quantities as to extinguish it by various applications of a powerful steam jet and a tank of water. The experiment was tried in England, twenty years ago, with much success, by Mr. GURNEY, who described his *modus operandi* in the following manner:

A small brick furnace, four feet square, was built up at a safe distance from the downcast shaft. The ash-pit was made entirely tight, except that it had an iron cylinder, thirteen inches in diameter, connected with it, which terminated with an elbow under water, in a tank partly filled. With the upper part of this tank, above the surface of the water, another pipe was connected and carried into the shaft leading down in the mine.

A powerful steam jet was made to work between the furnace and this tank, so as to draw the air down through the fire and force it through the water, while a second jet was placed in the cylinder, at the top of the downcast shaft, and made to draw the choke-damp from the tank and force it into the pit. This choke-damp was the product of the combustion of coal, assisted by a little charcoal and lime, through which the air was passed by the described contrivance, and thus deprived of its oxygen, while the azote was set free. At the upcast shaft, or outlet upwards, corresponding to the downcast shaft already mentioned, a third jet was placed in a cylinder and made to exhaust from the shaft beneath, so as to assist the other or compressing jets and draw the choke-damp through the galleries between them. All having been arranged, the apparatus was put in operation, and, in order to test the choke-damp and see if it was perfectly formed, tow, moistened with turpentine, was ignited and placed in it. The flame was immediately extinguished, and the experiment was so far perfectly satisfactory. The jets were put in action, and at the expiration of two hours, fire-damp disappeared from the shafts, and at the upcast shaft a slight cloudy appearance was observed in the air which escaped. This had a sulphurous smell, and indicated that the choke-damp had passed entirely through the mine.

In order to prove it still more satisfactorily, the draughts were shut off for a short time, and a safety-lamp being placed in the up-cast cylinder, it was immediately extinguished, proving the presence of the choke-damp in considerable quantity. During the two hours 6,000 cubic feet per minute of the damp had been forced into the mine. After being allowed to remain closed for some hours longer, the connection with the furnace was broken, and fresh air was driven through the same jets, which forced out all the choke-damp in about two hours. The mine was then regarded as perfectly safe, and several men descended the down-cast shaft 390 feet, to the tunnel leading to the workings, and all was found clear. The exhausting jet having been kept up all night, the next day some of the men passed through the workings and found all safe. The fire was entirely extinguished, and the action of the single jet was found to produce a more powerful current than could be done in any other way. It will be seen that by these means a great saving of time is effected in the extinguishment of those fires to which all collieries are so liable; for, instead of the months or years required for sealing up, flooding, and pumping out again, only two days are necessary to extinguish the most violent fire at trifling expense. For extinguishing fires in ships, carbonic acid gas may be easily produced in the lowest part of the ship, where chalk or marble dust should be kept in readiness near flat vessels of hydrochloric acid. As soon as the fire shows itself, all ports and means of communication with the open air must be stopped, and the carbonized gas prepared by the flow of the acid upon the chalk. The gas being heavier than common air (its specific gravity being 1.527), will displace the latter, and the whole ship will be filled with it, and all combustion will at once be stopped.

## Ingenious Engineering.

Isaac S. Geer, of Lisbon, Conn., in making some changes in a water pipe, found it needful to extend one through an under drain that ran several feet below the surface. How to get the pipe through without taking up the drain was a problem. But Mr. Geer studied upon it, and after awhile hit upon this admirable plan. He opened the lower end of the drain, and then catching an old calico cat that had been a resident of his family for several years, attached a small line to her leg, then thrusting her into the upper end, and giving a most unearthly "scat," she popped out at the other end, all covered with mud and water, with the line attached to her leg, quicker than one could say Jack Robinson. The pipe was thus drawn through, and Mr. Geer had the satisfaction of saving ten dollars by his wit, and teaching his neighbors a good lesson in civil engineering.

## MINING SUMMARY.

### Nevada.

THE HUMBOLDT REGION.

The Winnemecca *Register*, Dec. 25, has these items of mining news "A party of prospectors from Unionville, consisting of Messrs. Bushnell, Lott and Trescott, discovered late last fall, about seven miles west of Galena, Battle Mountain district, a ledge cropping on the hill-side, which they located and named the Trenton. The surface indications for a good mine being favorable, and the discoverers being practical miners, they immediately set to work to develop it. The location being favorable they commenced a tunnel on the vein which cropped on a steep hill-side, and have now run a tunnel 162 feet on the ledge, from which several tons of valuable ore have been extracted. The owners recently shipped to San Francisco ten tons of the ore, which they sold at a net profit of $130 per ton. The ore as taken from the ledge assays from $150 to $300 per ton in silver, besides containing a large per centage of copper. The owners of the Trenton are all Humboldters.

"Work, which in consequence of the volume of water encountered had to be suspended for a while, has been resumed on the new shaft on the Golconda mine, Gold Run district. The Superintendent, Mr. Negus, has put in a pump of sufficient capacity to drain the work. This shaft will strike the ledge at a much greater depth than the old one, and it is thought will develop a fine body of ore, as the vein is strong at the depth now attained. Burns & Co. have reached a depth of twenty feet on the Shepherdson, and have now in the shaft two feet of ore of a superior quality. Gregg & Watson, engaged in prospecting the Tartar, have a fine lot of ore on the dump, a portion of which they intend to ship to San Francisco in a few days. The owners of the Caledonian ledge, Battle Mountain district, have sold two-thirds interest in the mine to an English company for $20,000. The new owners are prosecuting work vigorously on the mine."

MINERAL HILL AND ITS ORES.

Mr. George Russell, of Mineral Hill, publishes in the Elko *Independent*, December 15, the following interesting data respecting the yield of mineral in this district. Mr. Russell is an old resident of Mineral Hill, and thoroughly posted on the resources and prospects of the camp.

"Shipped from Mineral Hill by Mineral Hill Mining company:

| No. Pounds. | Value per Assay. |
|---|---|
| 2,120 | $555 29 |
| 2,266 | 554 50 |
| 2.796 | 950 37 |
| 16.664 | 291 34 |
| 4.373 | 195 17 |
| 5,120 | 521 91 |
| 6,418 | 787 53 |
| 3,364 | 468 53 |
| 4,820 | 459 89 |
| 4,526 | 197 95 |
| 3,144 | 466 50 |
| 17,660 | 355 43 |

Average pulp assay per ton, $483 70.

"By Spencer Company—13,109 lbs., assayed value $307 per ton; by Alta company—12,332 lbs., assayed value, $292 per ton; by South Troy company—2,420 lbs., assayed value, $530 22 per ton; by Austin Ledge company—12,656 lbs., assayed value, $440 63 per ton.

"The amount of ore on the dumps of the Spencer company is 200 tons, which is estimated to be worth $150 per ton. Ward & Co., or Mineral Hill Mining company, have 500 tons of ore on hand, which will average $250 per ton. There have been gathered from the hill about fifty tons of float rock and shipped to Austin, which averaged $150 per ton. Several very fine ledges have lately been discovered which produce rock as valuable as that previously mentioned. Among these new discoveries is a ledge located by Colonel Coles, which is four feet in width and produces ore estimated, by actual test, to be worth $400 per ton. The day is not far distant when this camp will take position among the foremost of the State."

MINING ON THE COMSTOCK.

The following is from the *Enterprise's* mining summary for the week ending December 25: "Stock transactions during the past week have been light, and by no means show encouragingly to those whose interests would be best served by advanced rates. Much fault is being found by many who are holding stocks in anticipation of a rise. They generally attribute the downward tendency of Comstock claims to a concerted scheme on the part of persons seeking to obtain a ruling interest in certain mines. The more probable cause, however, is that many of the leading mines on the Comstock produce less ore and of a poorer grade than while the market was more buoyant and stocks were in greater request. Many of the upper levels have failed to supply milling ores, while the lead has not yet been reached from the lowest depths at which work is carried on. No material advance in stocks on the Comstock can be reasonably expected until developments of ore of undoubted richness have been made."

### New Mexico.

The Elizabethtown *Telegraph*, December 11, says: The greater portion of Dimmick & Co.'s mill has reached its destination on Ohio gulch. Thirty men are employed in mill and mine. Crawford & McCallum have again commenced work on the Gladstone silver lode near Scratch gulch on Quartz hill. The Benjamin lode is turning out better and better. The discovery of a new lode, with a 3-foot crevice, in the Last Chance region, is reported.

INTERESTING NOTES ON THE MINES, AND SKETCHES OF THE COUNTRY.

The following notes on this Territory from a correspondent of the Central City (Col.) *Register*, will be read with great interest by many of our readers. It is seldom we get so readable an account of our far-western mining districts. Beginning with the mines he says:

"Though the gold and silver mines of New Mexico have been worked for a longer period than any others in the United States, and are worked at the present time, still the product is but small compared with California, Nevada, etc. The principal, or only mines worked at present, are the placer and vein gold mines, which are nearly all located in the Rocky Mountains, near the northern portion of the Territory. The great obstacle in the way of placer mining is the scarcity of water. With an abundance of water the Moreno placer mines would pay good wages to a number of miners for a long time. The ditch which has been constructed to supply water, on account of the open porous nature of the earth in which it was dug, and the lateness of the season, when the volume of water was much diminished was, at the time, a failure. Owing to this, nearly all of the miners abandoned the district; consequently the gold product of these mines, this year, will be small. By fluming some portions of the ditch and puddling others, it can be made to convey a large amount of water, which would make Moreno a very thriving mining camp. In many parts of the Territory, especially south and east from Santa Fé, are placers that would pay for working if ditches were constructed to bring water. Ditches in that part of the country could hardly fail to be highly remunerative, as the water not required for mining could be used for irrigating agricultural lands. In

the old placers a limited number of miners have subsisted for a very long period, and even at the present time after a heavy rain they often pick up a number of dollars worth of gold that have been washed out by the rains. The most valuable portion of these mines is covered by a mineral grant of one hundred square miles, which prevents the miners from producing as much gold as though it was public land.

"VEIN MINING.

"The most successful vein mining in the Territory is that of Maxwell's. His mill, which has been running the past summer, has probably produced more gold than all the other mills in New Mexico. The veins in this locality are not as numerous as in Colorado or Nevada, but those that are opened appear to be well-defined and continuous. The gold being free is easily saved in a stamp-mill. In the northern part of the Territory is a good field for prospecting. There are many mines carrying free gold that have not been tested at all, and as they are on public land, this is probably the best locality for prospectors. The New Mexico Mining company, which owns the mineral grant at the Old Placers have expended large sums in the erection of a mill and in extracting ore from their mines. So far it has not been a financial success, owing to want of experience in the management. The grant abounds in veins carrying free gold. The company have one 50-stamp mill, and another of fifteen stamps, and there appears to be no reason why it should not be a fine paying property. If it could be made a success it would be a great benefit to the country; it would open a market for its agricultural product, put money in circulation and stimulate every other branch of business.

"In the new placers Gov. Mitchell and his company are running a mill on ores from the Candilaird mine, which is reported to be paying exceedingly well. The gold is mostly free and easily saved, though in one of the veins some difficulty has been experienced in amalgamation. Both Placers and Pinos Altos are about 45 miles southwest from Santa Fé, and are well supplied with all facilities for working, except that in some localities water is not very abundant. Recently at Pinos Altos a piece of quartz and gold, worth $300, has been found, which is probably the most valuable nugget that has ever been found in the Territory. There is no doubt that, if these mines were properly managed, they would give profitable employment to a large number of miners and mill-men. Labor is cheap, miners' wages being $1 50 per day, common laborers $1. Freights and provisions are much cheaper here than in California, Nevada, etc.—everything, except machinery.

"MAGDALINA MINES.

"In the Magdalina silver mountains, about 30 miles west from the Rio Grande, at Sonora, are a number of silver-bearing veins. They nearly all show a large amount of lead, with smaller amounts of copper. The veins are large and well defined, and can be traced on the surface for long distances. They are well situated for working, with plenty of wood and water. About seven miles northwest from these mines, is the Hubbell grant of mines; the veins are small but exceedingly rich, with surface ores that can be worked in iron pans without roasting. These veins have not been opened except to a very limited extent, but what has been done shows that, if opened and worked in a proper manner, they would prove highly remunerative.

"COPPER.

"Copper ores are found in nearly all of the gold and silver mines in the Territory, and those veins which carry no copper are generally poor in the precious metals. Copper ores of great richness are found in nearly all of the mountains, but generally the veins or deposits are small and irregular, and do not extend to any depth. In the Abo Pass there is a copper vein that appears to be large and well defined, and the Santa Rita copper mines have been famous for nearly a century. This mine has been worked by several different parties, and all have become enriched. It for a long time supplied the Mexican mint with copper for coinage. The price paid for it was seventy-five cents per pound, delivered in the City of Mexico. This has probably been the most profitable mine in the Territory of any description. The copper is mostly found in a metallic state, containing a sufficient amount of gold to pay for extraction. The amount of native copper taken from this mine is greater, than from any other in the world, except the mines of Lake Superior. This valuable mine is not worked at the present time, the owner being a woman, living in Spain, all efforts to purchase it having failed.

"COAL.

"Coal is found along the eastern base of the Rocky Mountains, from the British possessions to Mexico. It is generally light brown, or bituminous coal, that is suitable for generating steam and culinary purposes, but is not the kind required for melting iron. About forty miles south-west from Santa Fé, near the New Placers is a vein of heavy non-bituminous, or anthracite coal.

"It has been considered by some to be a bituminous coal that has been overlaid by a bed of lava, and the bitumen thus extracted from it. Why this hypothesis should be resorted to in order to account for its appearance is hard to imagine. It occurs in the cyrboniferous formations, the same in which the Pennsylvania anthracites is found; it has all the ordinary qualities of anthracite, and so far as opened is of a uniform character. If not anthracite, it answers every purpose as well.

"Near it is a fine bed or iron ore consisting of hematite, and carbonate of iron, with an abundant supply of fire-clay in the same locality; a combination of materials offering greater facilities for the manufacture of iron, than any other point in the extreme Western States and Territories.

"POPULATION.

"The number of inhabitants in New Mexico is probably over one hundred thousand, and of these nineteen twentieths are Mexicans. Emigration from the eastern States has not, as in California, swept away the former inhabitants. Here everything remains as it was; the manners, customs and modes of living remain the same as before it became a part of the United States. In California the Mexicans were greatly displeased with the change in government, although the advent of the Americans made all of them who had land rich; still they mourned for the days of supreme laziness and poverty of former times. Here it is different; the people are pleased with the change, and in the days of the rebellion proved their loyalty in the most conclusive manner by driving the Texan expeditions out of the Territory. They were born and raised in a republic and much more readily comprehended the spirit of our institutions than if they had been reared under a monarchy. They have not that taciturnity bordering on moroseness which is so characteristic of the native Californians, but have a French life and vivacity. Many of the principal families are pure Castilian descendents, of men who came to Mexico under Cortez. The land is owned in large farms, which are worked by the landless on shares, the land owner finding land, seed, implements and a house for the lessee, who receives half of the crop.

"HOUSES.

"Except in the most densely timbered portions of this Territory, all the houses are built of adobe, or sun-dried brick, with roofs of the same material. They are built in the form of a square, with an open court on the inside. All of the doors, except one or two outside doors, open into the court, also all of the windows. This gives a most gloomy, prison-like appearance to the outside of the houses. The outside walls are from two to three feet thick, and about thirteen feet high. The roofs are a foot or eighteen inches thick of adobe. The inside walls are not as thick, generally about two feet. They are first plastered with mud, and then a coating of plaster of Paris, and are as hard and clean as a wall of lath and plaster. The outside walls are plastered over once a year with mud, which keeps them tight and solid. The roofs are also treated to a fresh coat once a year. Preserved in this manner they do not leak any oftener than an ordinary shingle roof. The floors are also of mud. The ground is first dug up to the depth of six or eight inches, and thoroughly worked into a mortar, and then allowed to become dry or nearly so; then a second coat, an inch thick, is added, and then two or three more, each successively, thinner than the one before it. It takes it a long time to dry, but when once dry it remains so as long as the house stands, unless water runs over it. These houses are very seldom over one storey high, and their massy walls are a good protection against the heat in summer and the cold of winter; neither are they affected by winds, which in this country of extensive plains, at times, are very powerful. Adjoining the house is the house for stock of all kinds, and the barn for hay and grain. The outside wall is as high and strong as that of the house; the apartments for animals and grains are arranged around a square, the same as the rooms in the dwelling house. Some of these establishments are very large, covering one or two acres. This style of building is peculiarly adapted to a hot climate, and was no doubt borrowed by the Spaniards from the Moors. It is a form well calculated for defence against the Indians. A well built adobe house, with a few men in it, is impregnable to their assaults. In the poorest houses everything is wonderfully clean and neat; though chairs and tables are wanting, the room is always clean as it can be made. Every house has some religious picture, and the summit of devotion is reached when the owner is enabled to get a real wooden Jesus, on a wooden cross, hung in the most conspicuous part of the house. Smaller saints represented in the most painful circumstances of their lives are in great demand. This effort to make the Finite pity the Infinite is one of the leading ideas in the religion of the country, and to remind the saints of all of the unpleasantness which occurred in their lives does not appear to be the best way to win their favor.

"TOWNS.

"Santa Fé is the most noted town in the Territory. For years it has been famous; when Chicago and San Francisco were unknown it was already the commercial centre of an immense district. The Santa Fé trader who bought his goods in St. Louis, and freighted them across the plains through tribes of hostile Indians, consuming the whole year on the trip, according to his own romantic account, was exposed to many hardships and dangers, forming a very bloody character, suitable for the hero of those tales, 'To be continued,' which are found in the columns of all of the excellent and reliable family journals published in the far down East. His sufferings, in conjunction with those of the noble red man, have suffused the eyes of many a sweet-sixteen maiden, with the ice cream luxury of grief, which so abounds in the columns of those delectable publications. Santa Fé is built entirely of adobe, except one building, which was commenced for a Capitol for the Territory, but funds having run low, work on it was suspended, and now it is the only ruin in town. Its general appearance is that of quite a collection of brick kilns, just ready to be burned. Though one of the oldest towns in the United States, it has an air of uncertain age about it, which leaves in the mind of the observer no idea whatever of its years; showing that paint and plaster applied to towns, as well as to other objects, have a tendency to confuse the mind in regard to dates. The rude masons who built this town worked entirely by the square. The rooms are squares, the houses are squares, and they are arranged in squares, in a manner that would delight any right-angled man. The Plaza, or principal square, is fenced, planted with shade trees, and sown with grass, with walks running diagonally through it. It has a fine monument erected to the memory of those who have been slain in the various Indian wars, and in repelling the Texans, who invaded the Territory during the rebellion. It is a beautiful spot, and its decoration is a credit to the town. It is built on a small plain, which is completely commanded by Fort Marcy, situated on a small hill about half a mile to the north-east. The streets are narrow and straight, being laid out at right angles to one another, and owing to ditches are not very remarkable for their good condition. The most of the business houses are in the vicinity of the Plaza. A fire in Santa Fé is not possible; if the goods in a house should burn, the house would not, neither would it communicate to adjoining houses. Nearly all the trade of Sante Fé, and in fact of New Mexico, is in the hands of the Children of Israel. Many of their firms are wealthy, and have immense stocks of goods."

## Idaho.

LOON CREEK.

A correspondent writing from Oro Grande, Dec. 9, says: "There was quite an excitement here last week about a prospect having been found on the middle fork of Loon creek, in Smith's district, about three miles from Oro Grande, twenty-five cents to the pan, and only two feet deep, with plenty of water. About twenty-five claims were recorded, and the prospect looks very favorable for good diggings in the upper district. On the 2d inst. a party arrived from Montana, bringing animals all the way through, and report about twenty feet of snow on the divides and about ten inches in Leesburg. The tunnels are still in active operation, but it will take some time yet to test matters. Mining in the creek has ceased for the winter—Loon creek being frozen over in several places. A prospect has also been found in the lower discoveries, and many are strolling down that way to 'file.' Our camp promises better than ever for another season."

THE BOISE MINES.

According to the *Statesman*, Dec. 16, work has ceased for the season in the mines about forty miles up the river on account of the freezing weather. A dozen or so men will winter there, who will devote their time to sawing out lumber and making other preparations for active work in the spring. Mining on the Boise will be carried on extensively next season, and will add not a little to the business of Boise City.

## Arizona.

According to the Prescott *Miner*, December 11, those engaged in placer mining are doing remarkably well. On the Upper Hassayampa, two men recently took out, in two days, with a rocker, the sum of $22. Mining at Walnut Grove continues active. Parties from there report that C. B. Genung had cleaned up one arastra, and got a good return. The clean-up was made from Sutler ore. He was preparing to clean up another arastra, in which he had ground Blue-Jay ore. He had also started work on the Montgomery mine. The placer miners were making fair wages. Mr. Jos. Kelly, just in at Prescott from Wickenburg and Vulture City, informed the *Miner* that the Vulture Mining company's 40-stamp quartz mill at Vulture City, was working away when he left, making money for its owner. It was rumored in Wickenburg that Hinton & Smith had sold their mill and mining claim to a San Francisco company, who intended to build a larger mill soon—40 stamps, it was said. Heavy rains had fallen at Wickenburg. R. W. Groom and George Monroe were running an arastra on the White Pichaco mine. Work has commenced in the mining claims belonging to C. C. Bean, E. F. Bowers, and Lt. A. B. Wells, at the head of Lynx creek.

## Canada.

MADOC GOLD DISTRICT.

The Belleville correspondent of the Toronto *Monetary Times*, writing under date Dec. 20th, 1869, says: "The long period which has elapsed since my last letter has been almost a blank, as regards mining operations in this district, yet it has not been altogether barren of interest. Since the sale of the Richardson mine, negotiations have been going on between the new (old) company, the Phœnix, and the persons (creditors) who bought up the property. At last the affairs have been brought to a definite conclusion, and the company have obtained possession of the mine and works. I had a conversation with their manager, Mr. J. H. Dunstan, a few days ago; he is as firmly persuaded as ever that the mine will pay well, and from his experience in Brazilian mines, especially the 'Morro Velho,' where there is a very similar formation to that in which the 'Richardson' is situated, I should be inclined to pay considerable respect to his judgment. The new shaft has been put down some thirty feet and Mr. Dunstan expects to strike the vein at a depth of from sixty to seventy feet. I have seen specimens from the old shaft, taken from a depth of one hundred feet, in which the peculiar carbonaceous matter of the mine, containing visible particles of gold, is a prominent feature, showing that the vein is by no means exhausted. Dr. Williams and Mr. Jenkins have lately made a working test on the mispickel ore of the Cook lot, No. 7, in the ninth concession of Marmora, and though their machinery was in very indifferent order, and they had a difficulty in obtaining good fuel, they succeeded in obtaining eight ounces of retorted gold from 21 tons of the vein stone. Messrs. Turley & Gilbert have ceased working their mill, on lot six in the ninth concession of Marmora, for what reason I have not learned. It is reported that a certain company have contracted with Mr. Feigel for 200,000 tons of ore from his lode at $1 per ton, they taking out the ore themselves. I think the quantity is probably overstated. A gentleman who holds a prominent position in the township of Tudor informed me a few days ago that a very promising discovery had been made of a material quite different from any they had yet found, and promised to send specimens for examination; should he do so, and the thing is worth notice, I shall report again. On the whole, the mining prospect is more healthy than it has been for some time past; and as work will be confined to the *bona fide* gold bearing veins, and to respectable persons, there is reason to hope that the information we may receive will be reliable, be it favorable or the contrary."

## Australia.

The *Mining Record* of Victoria, of October 11, has the following interesting items: "A telegram received from Mr. Crisp, jeweller, Queen street, Melbourne, states that a stone which had been sent to him from Sandhurst to examine, is a diamond. This, the first Bendigo diamond, was found in the Epsom district. From Tasmania we learn that gold has been found at Port Cygnet. It consists chiefly of scaly gold, but some of the larger particles are quite of a shotty character, and a few are water-worn. The occurrence of gold at Port Cygnet is the more remarkable, because no silurian slates, quartz reefs, or other known sources of gold, have been reported to exist in the neighborhood. The prospectus of the United Victorian and Tasmanian Quartz Mining Company has been issued. The capital is to be £26,500, in 5,300 shares of £5 each. A rich alluvial diggings is reported to have been discovered at the Piper River. From New Zealand we learn that within a period of three months no less than eighty-six applications have been lodged for the registration of new companies on the Thames gold fields. The nominally paid-up capital of these companies is £1,532,522. The Tangil district, on the river of the same name, is the scene of considerable excitement, owing to the discovery of deposits of rich 'cement.' Stream tin has been discovered in the vicinity of Buchworth. Some most experienced miners are of opinion that a valuable lode must be close by, basing their opinion both on the quantity of the tin and the manner in which it is deposited. The bottom is granite, but there is sandstone not far above. Extensive experiments by Mr. Henry Koch, on the tailings of the Bendigo district, by concentration of pyrites, have given highly encouraging results—up to five ounces per ton."

## Oregon.

RYE VALLEY.—A La Grande paper says the late quartz discoveries are creating excitement—several ledges having been found that prospect well. The one known as the Monumental ledge assays fabulously. Some of the ore is pure—and a printed receipt from an assay office in Boise City shows $9,091 to the ton.

## BUSINESS AND PERSONAL.

[*Short notices in this column fifty cents per line each insertion.*]

IRON AND STEEL MANUFACTURE.—CLAIM OF PATENT No. 97,897 in the manufacture of Iron and Steel, subjecting the mass of molten metal to the action of hydrogen gas alone, forced up through the mass in combination with a current or currents of atmospheric air or oxygen, introduced over the molten metal within a chamber of reflecting character, producing combustion of the carburretted hydrogen, phosphuretted hydrogen, &c., above the metal, snbstantially as and for the purpose specified. WILLIAM ENNIS, Patentee and owner of this process, wishes to call the attention of manufacturers to the above claim. WILLIAM ENNIS,
Jan11-1m Thirty-ninth street, north of Bridge street, Philadelphia.

GLYNN'S ANTI-INCRUSTATION FOR STEAM BOILERS.—The only reliable article for removing and preventing incrustation. No foaming, and does not attack metals of boilers. Liberal terms to agents. C. D. FREDRICKS,
Dec. 21, tf. 587 Broadway, New York.

PYRITES WANTED—CONTAINING GOLD, SILVER, OR COPper. Address MICHIGAN CHEMICAL COMPANY,
Dec. 28-2t Jackson, Michigan.

## MARKET REVIEW.

### The Coal Trade.

NEW YORK, Jan. 7, 1870.

WHOLESALE.—Trade has not revived from its sluggish condition of last week. The low prices at which the Pittston company is retailing coal has a depressing effect, and certainly causes buyers to hold off. There is no question but that coal will rule very low in 1870. Everything shows a tendency in that direction. The new scale of prices adopted by the Schuylkill Anthracite Board of Trade, ($2 at Port Carbon, instead of $3, as last year,) the effort of the large Lackawanna companies to get control of the market, and the general shrinkage in values consequent upon the recent decline in gold, all contribute towards low prices for coal during the ensuing year. The consumption will of course be in proportion. Cheap fuel will enable our manufacturers to proceed with their business. Consumers generally will not be so economical for domestic uses, and the trade ought to increase next year fully 1,500,000 tons.

Our table this week shows the amount of coal brought to tide water by the various transportation companies for the year ending December 31, 1869.

The following communication has been sent to us for publication :

SECRETARY'S OFFICE, ANTHRACITE BOARD OF TRADE OF THE SCH. REGION.

POTTSVILLE, Jan. 1, 1870.

The following preambles and resolution, adopted by this Board at its stated meeting, at Tremont, December 29th, are here published for the information and guidance of all concerned :

"WHEREAS, The experience of the last six months has proven conclusively that the present basis of $3 per ton at Port Carbon, is entirely too high to permit coal from the Schuylkill region to compete with the large companies of the Luzerne region ; and

"WHEREAS, The course of those companies for the past shows a determination on their part to monopolize the trade on the seaboard ; and

"WHEREAS, The present enormous cost of production operates as a check upon the development of the manufacturing interests, and as a grave burden on the domestic consumers throughout the country ; therefore, be it

"*Resolved*, That hereafter the basis shall be fixed at $2 per ton at Port Carbon, and wages, whilst coal brings that rate, shall be

Outside Labor.....$7 50 per week.
Inside " ..... 8 50 per week.
Miners,.....10 50 per week.

"The contract work to be reduced from the present $3 basis, forty per cent.

"The advance in wages as the price of coal advances, shall be follows : When the average of all sizes from Lump to Chestnut (both inclusive), reaches $2 50, five per cent.; $3, ten per cent.; $3 25, fourteen per cent.; $3 50, seventeen per cent.; $3 75, twenty-one per cent.; $4, twenty-five per cent., and further advances in the same proportion, and in all cases powder, oil, &c., must be paid by the parties using the same.

"These prices to be obtained from the average of actual sales, as shown by the books of five operators."

ROBERT B. BEATH, Secretary.

Also the following interesting document :

ANTHRACITE BOARD OF TRADE.
SCHUYLKILL REGION, POTTSVILLE, Dec. 30, 1869.

WHEREAS, The following threatening notice has been posted up at the Colliery of the Knickerbocker Coal Co., threatening the life of one of its employees :

"Take notise Mr. Ketner, that you have to leave those premises in five Days notis or the result will be the loss of life, leave before i los a boll with you, as long as you are a man of family we will give those five days notise and if you dont you will be a Dead man."

Therefore, this Board offers a reward of two hundred and fifty dollars for such information as will lead to the arrest and conviction of the perpetrators of this outrage. ROBT. B. BEATH, Secy.

The Knickerbocker Coal Company offer an additional reward to the above of two hundred and fifty dollars.
M. P. FOWLER, Supt.

We hope the perpetrators of the above outrage will be found out and brought to justice. It is high time that such doings, in America, a free country, should be stopped. We are much pleased with the action taken by the Anthracite Board of Trade and the Secretary of the Knickerbocker Coal Company for the prompt suppression of this evil.

RETAIL.—The principal event in the retail trade has been the new circular issued by the Pennsylvania Coal Company, offering Pittston Coal, per 2,000 lbs., at the following rates : Grate and Egg, $6 50 ; Stove, $7 ; Chestnut, $6, delivered ; Grate and Egg, $5 50 ; Stove, $6 ; Chestnut, $5, in yard. This has, of course, upset matters generally, and competition with this Company seems to be out of the question. We understand that this Company sold 1,000 single tons from their yards in one day (yesterday). The Lackawana Company is yet selling at $7 50 for stove size, and Lehigh coal is bringing from $8 to $9 50.

FREIGHTS.—Vessels are in fair supply ; the dullness of trade makes the rates very low, and captains find much fault. The Scranton Company are filling orders at Elizabethport with dispatch, the detention being only one or two days.

### Penn. and N. Y. Canal and Railroad Co.

REPORT of Coal Transported via. the Pennsylvania and New York Canal and Railroad Company, for week ending January 1st, 1870 :

| | |
|---|---|
| Anthracite | 3,920 18 |
| Previously this year | 9,959 16 |
| Total | 13,880 14 |
| Bituminous | 3,852 00 |
| Previously this year | 12,036 00 |
| Total | 15,948 00 |

The following table exhibits the quantity of Coal passing over the following routes of transportation for the week ending December 31, 1869, compared with the same time last year :

| COMPANIES. | 1868. WEEK. | 1868. TOTAL. | 1869. WEEK. | 1869. TOTAL. |
|---|---|---|---|---|
| Phila. & Reading R.R. | | 3,287,082 | | 3,688,905 |
| Schuylkill Canal | | 987,627 | 392 | 698,879 |
| Lehigh Valley R. R. | | 2,225,630 | | 2,025,296 |
| Lehigh and Sus. R. R. | 14,621 | 662,215 | 22,408 | 992,508 |
| Lehigh Canal | | 989,947 | | 605,144 |
| Scranton North | | 610,721 | | 453,173 |
| " South | | 1,118,034 | | 1,110,815 |
| Penn. Coal Co., rail | 15,220 | 924,850 | 14,214 | 947,930 |
| " " " canal | | 29,005 | | 18,707 |
| Del. and Hudson, rail | | | 10,911 | 190,389 |
| " " canal, north | | 1,640,118 | | 1,206,280 |
| " " " south | | | | 122,687 |
| Shamokin | 2,096 | 492,265 | 5,131 | 474,525 |
| Trevorton | | 38,727 | | 36,808 |
| Short Mountain | 191 | 124,045 | 105 | 104,766 |
| Lykens Valley Canal Co. | | 86,639 | | 78,965 |
| Huntingdon & Br'd Top | 5,720 | 278,463 | 5,863 | 389,409 |
| Wyoming South | | 340,420 | | 384,706 |
| " North | | 89,152 | | 76,308 |
| Williamstown. Coal'y | 236 | 178,302 | 668 | 201,018 |
| P. N. Y. C. & R. R. Co. | | | 3,921 | 13,881 |
| Total | 38,084 | 13,803,272 | 63,613 | 13,658 336 |
| 1869 | | 13,658,596 | 58,084 | |
| Decrease year | | 144,676 | | In. week. |

### Schuylkill Coal Trade.

Report of coal transported over the Schuylkill Canal for the week ending Thursday, December 30, 1869.

| | Tons. Cwt. |
|---|---|
| From Port Carbon | 163 10 |
| " Pottsville | |
| " Schuylkill Haven | 183 10 |
| " Port Clinton | 45 00 |
| Total for week | 392 00 |
| Previously this year | 698,486 13 |
| Total | 698,878 13 |
| To same time last year | 987,627 10 |

Report of Coal transported via the P. and R. R. for the week ending Dec. 30, 1869—less coal carried for Company's use, and Bituminous Coal :

| | |
|---|---|
| For week | 24,941 15 |
| Previously this year | 223,337 07 |
| Total | 248,279 02 |
| Same time last year | 201,323 00 |
| Decrease | 46,956 02 |
| Amount sent same week 1868 | 23,230 00 |

Report of coal transported on the Philadelphia and Reading Railroad for the week ending Thursday, December 30, 1869 :

| | |
|---|---|
| From St. Clair | 5,091 06 |
| " Port Carbon | 1,864 09 |
| " Pottsville | 2,327 02 |
| " Schuylkill Haven | 6,441 15 |
| " Auburn | 152 13 |
| " Port Clinton | 9,092 11 |
| " Allentown and Alburtis | 32 00 |
| " Harrisburgh and Dauphin | 5,512 03 |
| Total paying freight | 30,453 18 |
| Coal for Company's use | 1,713 18 |
| Total for week | 32,167 16 |
| To same time last year | 264,509 06 |
| Total | 296,677 02 |
| To same time last year | 191,762 13 |

### Harrisburgh and Dauphin Coal Trade.

The following is the amount of Bituminous Coal transported via the P. and R. R. for the week ending Dec. 30, 1869 :

| | Tons. |
|---|---|
| For week | 5,512 03 |
| Previously this year | 30,197 14 |
| Total | 35,709 17 |

### Report of Coal Transported over Lehigh Valley Railroad

For the week ending January 1st, 1870, and previously this season, compared with same time last year :

| WHERE SHIPPED FROM. | WEEK. Tons. Cwt. | PREVL'Y. Tons. Cwt. | TOTAL. Tons. Cwt. |
|---|---|---|---|
| Total Wyoming | 12,091 03 | 37,309 00 | 49,400 00 |
| " Hazleton | 31,356 08 | 84,463 19 | 115,820 07 |
| " Upper Lehigh | | | |
| " Beaver Meadow | 8,665 03 | 40,493 01 | 49,158 04 |
| " Mahanoy | 6,633 10 | 26,959 19 | 33,593 09 |
| " Mauch Chunk | 38 11 | 122 13 | 161 04 |
| Total Anthracite | 58,784 12 | 189,348 12 | |
| Bituminous Coal rec'd from Cata. R. R. | | | |
| N. C. R. R. | | | |
| E. P. R. R. | | | |
| P. & N. Y. C. & R.R. Co | | 1,743 00 | 1,743 00 |
| Fall Creek | | | |
| Schroeder | | | |
| Towanda | | | |
| Total by rail and canal | 58,784 12 | 191,091 12 | 249,876 04 |
| Same time last year | 26,073 14 | 146,922 12 | 172,996 06 |
| Increase | 32,710 18 | 44,169 00 | 76,879 18 |
| Decrease | | | |
| Forwarded East from M'h Chunk by rail | 52,093 14 | 175,267 09 | 27,361 03 |
| Same time last year | 25,812 04 | 132,372 19 | 158,183 03 |
| Increase | 26,281 10 | 42,896 10 | 69,178 00 |

RECAPITULATION.

| | | | |
|---|---|---|---|
| Forwarded East from M'h Chunk by rail | 52,093 14 | 175,267 09 | 227,361 03 |
| To N. C. R. R., at Mount Carmel | | 115 00 | 115 00 |
| Forwarded North from L. & B. Junction | 3,920 18 | 9,549 19 | 13,470 17 |
| To L. & S. R. R. at Packerton for rail | 174 10 | 344 04 | 518 14 |
| Delivered at M'h Chunk | 21 03 | 103 17 | 125 00 |
| Delivered on line of road above Mauch Chunk | 202 15 | 575 16 | 778 11 |
| Delivered above M. Chunk for use of L. V. R.R. | 2,371 12 | 2,736 18 | 5,108 10 |
| To L. & S. R. R., at P'n Hav., for railroad | | | |
| Do. for canal | | | |
| At M Chunk for canal | | 655 09 | 655 09 |
| Total Anthracite | 58,784 12 | 189,348 12 | 248,133 04 |
| Bituminous Coal | | 1,743 00 | 1,743 00 |
| Total all kinds | 58,784 12 | 191,091 12 | 249,876 00 |

### Lehigh and Susquehanna Railroad.

REPORT of Coal Shipped South for the week ending Dec. 31, 1869.

| WHERE FROM | WEEK. Tons. Cwt. | TOTAL. Tons. Cwt. |
|---|---|---|
| *Wyoming.* | | |
| Parrish & Thomas | 739 00 | 51,813 06 |
| New Jersey Coal Co | 114 08 | 24,976 12 |
| Lehigh Luz. Coal Co | 228 14 | 34,156 11 |
| Pine Ridge | | 28,501 19 |
| Germania Coal Co | 544 08 | 22,155 05 |
| Franklin Coal Co | | 62 04 |
| Mocanauqua Coal Co | | 2,050 04 |
| West Pittston Coal Co | | 52 07 |
| Kingston Mines | 61 14 | 61 14 |
| Wilkesbarre C. & I. Co | 8,872 03 | 420 428 10 |
| Del. & Hud. Canal Co | 1,171 16 | 40,594 09 |
| Mineral Spring Coal Co | 656 05 | 17,576 00 |
| H. B. Hillman & Son | | 9,305 00 |
| Bowkley, Price & Co | | 1,686 09 |
| Wyoming C. & T. Co | | 2,891 11 |
| Henry Colliery | 35 14 | 24,262 17 |
| J. H. Swoyer | | 3,446 00 |
| Everhardt Coal Co | 309 06 | 35,167 14 |
| Morgan Mines | | 49 02 |
| Shawnee | 215 14 | 37,274 02 |
| Lances Colliery | 397 16 | 12,342 09 |
| Albrighton, Roberts & Co | | 7,117 09 |
| New England | | 9,120 00 |
| Consumers Coal Co | 52 05 | 6,773 19 |
| Reynolds | 284 01 | 18,368 19 |
| Gaylord | 1,001 13 | 7,789 03 |
| Maltby | 133 16 | 1,876 08 |
| Nottingham | 143 10 | 17,917 15 |
| Total Wyoming | 15,679 03 | 841,719 18 |
| *Upper Lehigh.* | | |
| Upper Lehigh Coal Co | | 77,261 17 |
| Total Upper Lehigh | | 77,261 17 |
| *Hazleton.* | | |
| A. Pardee & Co | 11 15 | 29,579 13 |
| Linderman & Skeer | | 25 05 |
| Sharpe, Weiss & Co | | 13,026 05 |
| W. S. Halsey & Co | 24 14 | 1,297 15 |
| Harleigh Coal Co | | 11,079 08 |
| G. B. Markle & Co | | 12,409 06 |
| Ebervale Coal Co | | 12,234 09 |
| Stout Coal Co | | 6,578 19 |
| Buck Mountain Coal Co. | | 18,737 11 |
| Coxe Brothers & Co | 22 00 | 5,166 05 |
| Ashburton Coal Co | 64 07 | 2,702 03 |
| Highland Coal Co | | 1,453 16 |
| Pardee, Bros. & Co | | 3,055 16 |
| Jeddo Coal Co | | 3,123 19 |
| Mount Hall | | |
| Other Shippers | | 467 12 |
| Total Hazleton | 122 16 | 120,938 02 |
| *Mauch Chunk.* | | |
| Lehigh Coal & Nav. Co. | 6,605 16 | 204,870 16 |
| Summit Mines | | 53,033 18 |
| Room Run Mines | | |
| Total Mauch Chunk | 6,605 16 | 257,904 14 |
| Total Mauch Chunk Region | 6,605 16 | 257,904 14 |
| " Hazleton " | 122 16 | 120,938 02 |
| " Upper Lehigh " | | 77,261 17 |
| " Wyoming " | 15,679 03 | 841,719 18 |
| Grand Total | 22,407 15 | 1,297,824 11 |
| Corresponding week last year | 14,621 06 | 1,042,683 06 |
| Increase | 7,786 09 | 255,141 05 |
| Decrease | | |
| Forwarded South from Mauch Chunk | 22,058 19 | 933,569 06 |
| Delivered on line of Lehigh & Sus'na R. R., above Mauch Chunk | 260 12 | 34,548 04 |
| Delivered to Lackawanna & Bloom. R. R., at Plymouth Bridge | 88 04 | 18,239 06 |
| Delivered to Lehigh Valley R. R. Co., at Sugar Notch | | 5,151 03 |
| Delivered at Coal Port, for shipment by Canal | | 305,316 12 |
| Total | 22,407 15 | 1,297,824 11 |

### Prices of Coal by the Cargo,

[CORRECTED WEEKLY.]

| | AT NEW YORK, Jan. 7. R. A. | W. A. | AT PHILADELPHIA, Jan. 6. R. A. | W. A. |
|---|---|---|---|---|
| SCHUYLKILL. | | | | |
| Lump | $— — | $5 50 | 5 50 | 5 50 to 5 75 |
| Steamer | — — | 5 50 | — — | 5 00 to 5 25 |
| Broken | — — | 6 00 | — — | — — to 5 — |
| Egg | 7 50 to — — | 6 50 | — — | 5 00 to 5 25 |
| Stove | 7 00 to — — | 7 00 | — — | 5 25 to 5 50 |
| Chestnut | 5 50 to — — | 5 00 | — — | 4 75 to — — |
| Pea | — — | — — | — — | — — |
| LEHIGH. | | | | |
| Lump | — — | 7 10 | — — | — — |
| Steamer | — — | — — | — — | — — |
| Broken | — — | 6 60 | — — | — — |
| Egg | — — | 7 60 | — — | — — |
| Stove | — — | 8 10 | — — | — — |
| Chestnut | — — | 6 10 | — — | — — |
| Pea | — — | — — | — — | — — |
| SPECIAL COALS.* | | | | |
| Diamond Vein | R. A. | 6 50 | — — | — — |
| New England | " " | — — | — — | — — |
| Locust Dale | W. A. | 6 00 | — — | — — |
| Honey Brook, Le'h | W. A. | 5 50 to 6 25 | — — | — — |
| Spring Mount | " " | 5 50 to 6 25 | — — | — — |
| Sugar Creek | " " | 5 50 to 6 25 | — — | — — |
| Sugar Loaf | " " | 5 50 to 6 25 | — — | — — |
| Fulton | " " | 5 50 to 6 25 | — — | — — |
| Stout | " " | 5 50 to 6 25 | — — | — — |
| Old Comp'y's | " " | 5 50 to 6 25 | — — | — — |
| Cross Creek | " " | 5 50 to 6 25 | — — | — — |
| Chauncey | " " | — — | — — | — — |
| Girardville | " " | — — | — — | 5 00 to 5 50 |
| McMichael | " " | — — | — — | 5 00 to 5 50 |
| Duncan | " " | — — | — — | 5 50 to 6 00 |
| Shamokin | " " | 6 50 | 6 50 | — — |
| Lykens Valley | " " | — — | 8 00 | — — |
| Broad Top | " " | — — | 5 00 | — — |
| Hill & Harris | " " | — — | 7 00 | — — |
| Henry Clay | " " | — — | 7 00 | — — |
| Powelton | " " | — — | 6 50 | — — |
| Burnside | " " | — — | — — | 6 00 |

BITUMINOUS COALS.

| | | |
|---|---|---|
| Kittaning Coal Co.'s Phœnix Vein | f.o.b. at Phila. | $5 25 |
| " Lemon " | " " | 5 00 |
| Cumberland C. & I. Co.'s on board | N. Y. | 7 50 |
| Central C. & M. Co.'s | " | 7 50 |
| Consolidated Coal Co.'s | " | 7 50 |

[*Dealers in these coals may be found in our advertising columns.]

### Company Coals.

| | L. | Str. | Gra. | Eg. | Sto. | Ches. |
|---|---|---|---|---|---|---|
| Scranton at E. Port | — — | — — | — — | — — | — — | — — |
| Pittston at N. Y | 6 30 | 6 30 | 6 40 | 6 40 | 7 25 | 6 10 |
| Lackawana at Weh'kn. | 5 50 | 5 75 | 6 00 | 6 00 | 6 50 | 5 50 |
| Wilk'b're at Hoboken | 5 50 | 5 75 | 6 00 | 6 00 | 6 50 | 5 50 |
| Old Co. Lehigh at Pt. Johnston | 6 75 | 6 00 | 6 00 | 6 00 | 7 25 | 6 50 |
| Lehigh at E. Port | 6 25 | 5 50 | 5 50 | 5 50 | 6 25 | 5 25 |

For freights to different points, see "Freights."

### Prices for Coal at Mauch Chunk.

| | F.L. | Bro. | Gra. | Eg. | Sto. | Cst. |
|---|---|---|---|---|---|---|
| Lehigh | $0 00 | $0 00 | $0 00 | $0 00 | $0 00 | $0 00 |
| Wilkesbarre | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 |

For freight to Elizabethport and to New York see "Freights."

### Prices of Foreign Coals.

January, 1870.
Duty $1 25 per ton.
Corrected weekly by PARMELE BROS., No 32 Pine street, New York.

| | |
|---|---|
| Liverpool Gas Caking | $ 9 50@— — |
| " Cannel | 13 00@14 00 |
| " House " | 14 50@17 50 |
| " " Orrel | 14 00@16 00 |

Per ton 2,240 lbs., ex-ship.
PRICES FROM YARD.

| | |
|---|---|
| Liverpool House Orrel, screened | $16 00@18 00 |
| " " Cannel | 18 00@19 00 |

Per ton 2,000 lbs., delivered

### Prices of Gas Coals.

January, 1870.
PROVINCIAL.

| Duty, $1 25. | Coarse. Gold. | Slack. Gold. |
|---|---|---|
| Block House | $1 75 @— 75 | |
| Gowrie | 1 75 @— 75 | |
| Lingan | 1 75 @— 75 | |
| Sydney | 2 13¼@— 71½ | |
| Pictou | 2 13¾@1 18¾ | |
| Little Glace Bay | 1 50 @1 00 | |
| Caledonia | 1 50 @— 75 | |

AMERICAN.

| | Coarse. Currency. | Slack. Currency. |
|---|---|---|
| Westmoreland Co | — — | @— — |
| Despard Coal Co | $8 50 | @8 00 |
| Penn | — — | @— — |
| Newburg Orrel Gas | — — | @— — |
| West Fairmount Gas Coal | — — | @8 00 |

AT PHILADELPHIA.

| | |
|---|---|
| Powelton | $7 80 |

### Prices at Baltimore—Jan. 1870.

*Wholesale Prices to Trade.*

| | |
|---|---|
| Wilkesbarre, by cargo or car load | $7 75@7 90 |
| Pittston and Plymouth | 7 50@7 75 |
| Shamokin Red or White Ash | 6 75@7 00 |
| Lykens Valley Red Ash | 7 30@7 55 |
| Trevorton, Red Ash | 6 75@7 25 |
| By retail, per ton of 2240 lbs. delivered | 8 25@8 50 |
| Georges Creek & Cumberland f. o. b. at Locust Point for shipping | — —@5 00 |
| West Fairmount Gas f. o. b. | — —@6 50 |

### Prices at Georget'n, D.C., & Alexandria, Va.

January, 1870.

George's Creek and Cumberland f. o. b. for shipping..$4 75

### Prices at Havre de Grace, Md.

| | |
|---|---|
| Wilkesbarre and other White Ash for cargoes | $— —@— — |
| Lykens Valley | — —@— — |
| Shamokin Red or White Ash | — —@— — |
| Trevorton and Zebra Valley | — —@— — |

### Rates of Transportation to Tide Water.

*BY RAILROAD.*

TO PORT RICHMOND, PHILADELPHIA.

| | |
|---|---|
| Philadelphia and Reading Railroad, from Schuylkill Haven | $2 50 |
| From Port Carbon, 8 cents per ton more. | |

TO ELIZABETHPORT.

| | |
|---|---|
| L. V. Railroad from Mauch Chunk to Easton | $1 15 |
| C. R. R., N. J., Easton to Elizabethport | 1 70 |
| Shipping expenses at Elizabethport | 25 |
| Total | $3 10 |

TO PORT JOHNSON.

| | |
|---|---|
| L. V. R. R | $1 15 |
| C. R. R., of N. J | 1 80 |
| Shipping expenses | 25 |
| Total | $3 20 |

TO HOBOKEN.

| | |
|---|---|
| L. V. R. R | $1 15 |
| Morris & Essex R. R | 1 80 |
| Shipping expenses | 25 |
| Total | $3 20 |

TO SOUTH AMBOY.

| | |
|---|---|
| L. V. R. R | $1 15 |
| B. & D. R. R | 1 10 |
| Cam. & Am. R. R | 50 |
| Shipping Expenses, | 25 |
| Total | $3 00 |

### Freights.—JANUARY, 1870.

| TO EASTERN PORTS. | From Philada'a. | From E. Port and Port Johnston. | From Newburg. | From Rondout. |
|---|---|---|---|---|
| Stamford | $2 00 | $1 10 | @ | @ |
| Norwalk | 2 25 | 1 15 | | |
| Bridgeport | 2 00 | 1 10 | | |
| New Haven | 2 25 | — — | | |
| Hartford | 2 75 | | | |
| New London | 2 00 | 1 40 | | |
| Norwich and Sou | 2 00 | 1 50 | | |
| Mystic | 2 00 | — — | | |
| Stonington | 2 00 | 1 40 | | |
| Sag Harbor | 2 00 | 1 10 | | |
| Bristol | 2 25 | 1 40 | | |
| Newport | 2 25 | 1 40 | | |
| Fall River | 2 25 | 1 40 | | |
| Providence | 2 25 | 1 40 | | |
| Dighton | — — | — — | | |
| Warren | — — | — — | | |
| Pawtucket | 2 25 | | | |
| New Bedford | 2 25 | 1 40 | | |
| East Cambridge | 3 00 | — — | | |
| Salem | 3 00 | 2 00 | | |
| Newburyport | 3 10 | 2 00 | | |
| Portsmouth, N. H | 3 33 | 2 00 | | |
| Rockport | — — | — — | | |
| Saco | 3 00 | 2 00 | | |
| Portland | 3 00 | 2 00 | | |
| Bangor | 3 00 | — — | | |
| Bath | 3 00 | 2 00 | | |
| Middletown | — — | — — | | |
| Amesbury | 3 25 | — — | | |
| Boston | 3 15 | 2 00 | | |
| Cambridgeport | 3 00 | — — | | |
| Taunton | 3 10 | 2 00 | | |
| Derby | 2 00 | — — | | |
| New York | 1 75 | 50 | | |
| Hackensack | 1 95 | — — | | |
| Jersey City | 1 75 | 50 | | |
| TO RIVER PORTS. | | | | |
| Troy | — — | — — | | |
| Albany | — — | — — | | |
| Coeyman's | — — | — — | | |
| Stuyvesant | — — | — — | | |
| Cockaackie | — — | — — | | |
| Hudson | — — | — — | | |
| Catskill | — — | — — | | |
| Poughkeepsie | — — | — — | | |
| Fishkill | — — | — — | | |
| Cold Spring | — — | — — | | |
| Haverstraw | — — | 50 | | |
| Nyack | 1 60 | 50 | | |
| Sing Sing | 1 60 | — — | | |
| Yonkers | — — | 40 | | |
| New York | — — | — — | | |
| Saugerties | — — | — — | | |
| Rhinebeck | — — | — — | | |
| Rondout | — — | — — | | |
| Tarrytown | 1 60 | 80 | | |
| West Point | — — | — — | | |

### Cumberland Coal Trade.

B. & O. RAILROAD.

The shipments over the Baltimore & Ohio Railroad for the week ending Jan. 1, 1870, were as follows :

| From Georges Creek via Piedmont. | Tons. |
|---|---|
| Consolidation Co | 380 04 |
| Borden Co | 368 03 |
| Balt. & Hampshire Co. | |
| Maryland Co. | |
| From Eckhart R. R. | |
| C. C. & I. Co. | 696 07 |
| Total | 1,464 14 |

### METALS.

IRON.—Duty: Bars, 1 to 1½ cents ₱ lb ; Railroad, 70 cents ₱ 100 lbs. ; Boiler and Plate, 1½ cents ₱ lb ; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb ; Pig, 9 ₱ ton ; Polished Sheet, 3 cents ₱ lb.

| | |
|---|---|
| Pig, Scotch No. 1, ₱ ton | 32 00@34 00 |
| Pig, American, No. 1 | — —@— — |
| Pig, American, No. 2 | 35 —@36 — |
| Pig, American, Forge | 33 —@35 — |
| Bar, Refined, English and American | — —@82 50 |
| Bar, Swedes, assorted sizes (gold) | 80 00@82 50 |
| | *Store Prices.* |
| Bar, Swedes, ord'y sizes, less 5 ₱ ct. | 120 —@130 — |
| Bar, Refined " " | 85 —@— — |
| Bar, Common " " | — —@ 80 — |
| Scroll " " | 110 —@135 — |
| Ovals and half-round " " | 110 —@— — |
| Band " " | 110 —@— — |
| Horse Shoe " " | 110 —@— — |
| Rods, ⅝ to 3-16 inch " " | 90 —@140 — |
| Hoop " " | 115 —@160 — |
| Nail rod, less 5 ₱ ct. | — 8—@— 8½ |
| Sheet, Russia, as to Nos. (gold) | — 11—@—12— |
| Sheet, Single, D. and T. Common | — 5½@— 7 |
| Sheet, Galvanized | List 15@25 ₱ cent. discount. |
| Rails, English (gold), ₱ ton | 56 50 @57 00 |
| Rails, American, at Works in Pa. | 76 00 @77 00 |

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2½ cents ; over 7 cents and not above 11, 3 cents ₱ lb ; over 11 cents, 2½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

| | |
|---|---|
| English Cast (2d and 1st quality) ₱ lb | — 16 @— 20 |
| English Spring (2d and 1st quality) | — 7 @— 10 |
| English Blister (2d and 1st quality) | — 11 @— 18 |
| English Machinery | — 11½@— 14 |
| English German (2d and 1st quality) | — 13 @— 15 |
| American Blister "Black Diamond" | — 10½@— 16 |
| American, Cast, Tool do. | — 19 @— — |
| American, Spring, do. | — 10 @— 13 |
| American Machinery, do. | — 10 @— 13 |
| American German, do. | — 10 @— 13 |

COPPER.—Duty: Pig, Bar, and Ingot, 5 ; old Copper cents ₱ lb ; Manufactured, 45 per cent. ad val.

| | All Cash. |
|---|---|
| Copper, New Sheathing, ₱ lb | — @— 32 |
| Copper Bolts | — @— 33 |
| Copper Braziers, 16oz. and over | 33 @— 35 |
| Copper Nails | 38 @— 40 |
| Copper, Old Sheathing, &c., clean | 18 @— 19 |
| Copper, Chili Pig | — @— — |
| Copper, American Ingot | 21¼@— 22 |
| Yellow Metal, New Sheating | — @— 27 |
| Yellow Metal Bolts | — @— 27 |
| Yellow Metal Nails | — @— 27 |

LEAD.—Duty: Pig, $2 ₱ 100 lbs. ; old Lead, 1½ cents ₱ lb ; Pipe and Sheet, 2½ cents ₱ lb.

| | |
|---|---|
| Galena, ₱ 100 lbs | $— — @— — |
| Spanish (gold) | 6 25 @6 30 |
| German, do. | 6 25 @6 37½ |
| English, do. | 6 25 @6 75 |
| Bar (net) | 8 37½@— — |
| Pipe and Sheet (net) | 8 37½@— — |

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val. ; Plate and Sheets and Terne Plates, 25 ₱ cent. ad val.

| | Gold ₱ lb. |
|---|---|
| Banca | 33 @34 |
| Straits | 31½@32 |
| English | — @30 |

| PLATES. Fair to Good Brands. | Gold. | Currency. |
|---|---|---|
| I. C. Charcoal, ₱ box | $8 00 @8 25 | $10 25 @10 75 |
| I. C. Coke | 6 75 @7 37½ | 8 50 @ 9 50 |
| Coke Terne | — — @6 00 | — — @ 8 00 |
| Charcoal Terne | 7 25 @8 00 | 9 50 @10 25 |

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ₱ 100 lb.

| | Gold. |
|---|---|
| Plates, Foreign ₱ 100 lbs. | $6 12½@6 25 |
| Plates, Domestic ₱ lb. | 10 @— 12 |

REMARKS.

TIN.—The market for both Pig and Plates is lifeless ; stocks of both are larger than usual at this time of the year, and, with drooping prices in Europe, and absence of demand here, prices of large lots are very unsettled and entirely nominal. Banca may be quoted at 33 @ 33¼ cents for trade parcels ;

Straits, 31¾c. @ 32c., and English 30c., all gold. Plates are jobbing at $8 25 for I. C. Charcoal; Coke Tin, $6 50 @ $7 75, as to quality; Charcoal Terne, $7 50 @ $8, and Coke Terne, $5 50 @ $6 50, all gold. Imports of Plates at New York for 1869, 1,066,415 bxs.; other Ports, 268,108; total imports for 1869, 1,334,523 bxs., against 1,187,947 in 1868, 993,744 in 1867, 1,021,261 in 1866, 784,930 in 1865, and 504,682 in 1864.

Stock of Pig in first and speculative hands, Jan. 1:

| | 1867. | 1868. | 1869. | 1870. |
|---|---|---|---|---|
| Banca.....slabs | 3,000 | 1,200 | 2,000 | 1,500 |
| Straits..... | 10,000 | 5,000 | 7,400 | 3,500 |
| English.....tons | 20 | 40 | 20 | 180 |

IRON.—The market for both Scotch and American Pig remains quiet, there being no inquiry for other than small lots from yard, but prices are without change; we have only to notice the sale of 100 tons Eglinton at $32 50, cash.

| Stock, January 1: | 1867. | 1868. | 1869. | 1870. |
|---|---|---|---|---|
| Scotch Pig.....tons | 1,000 | 12,000 | 1,500 | 3,000 |

COPPER.—Manufactured is steady at our quoted rates. Ingot is quiet, but prices are about the same; sales have been made of 200,000 lbs. Lake Superior at 21¾ @ 21⅞ cents.

Estimated Stock of Ingot at this Port, January 1:

| | 1867. | 1868. | 1869. | 1870. |
|---|---|---|---|---|
| L. Superior...lbs. | 6,000,000 | 7,000,000 | 6,000,000 | 7,000,000 |
| Balt., Tenn., etc... | 2,000,000 | 3,000,000 | 1,000,000 | 2,000,000 |

LEAD.—Pig is without demand, but with a moderate stock prices are nominally as before—say $6 25 @ $6 30, gold, for ordinary Foreign.

Stock in New York, January 1:

| 1865. | 1866. | 1867. | 1868. | 1869. | 1870. |
|---|---|---|---|---|---|
| Tons..5,300 | 1,500 | 2,000 | 6,300 | 1,500 | 1,250 |

SPELTER—Is without demand, and prices are entirely nominal.

Stock, Foreign, in New York, January 1:

| | 1866. | 1867. | 1868. | 1869. | 1870. |
|---|---|---|---|---|---|
| Tons..... | 350 | 1,300 | 700 | 350 | 650 |

ZINC.—American Zinc, dry, 8c. @ 8½c.; French, dry,, 10½c. @ 11c.; Metal Sheet 8¾c., gold.

MANGANESE—5c. per lb.; lump, 4½c.

### Mining Stocks.

NEW YORK, Jan. 7, 1869.

The prices for some stocks are somewhat stronger, though there is but very little business doing. Quartz Hill sold yesterday, s. 3, at 75c., and Gregory, s. 3, at $1 50. Mariposa, in consequence of the recent favorable reports from the mines, is stronger and more active.

Copper stocks continue inactive. Quincy is offered at 30 cents.

Petroleums have declined in some instances, but the general tone of the market is unchanged since our last. The following is the latest report of quotations at the Stock Exchange:

| | Bid. | Asked. |
|---|---|---|
| Bennehoff | 50 | — |
| Brevoort | 1 00 | — |
| Buchanan Farm | 39 | 45 |
| Central | 60 | 64 |
| Home Petroleum | 5 00 | 7 00 |
| National | — | — |
| New York and Alleghany | 1 35 | — |
| Northern Light | — | 85 |
| Rathbone Oil | 20 | — |
| Rynd Farm | 45 | 49 |
| Pithole Creek | — | 2 50 |
| United Petroleum Farms | 18 | 21 |
| United States | 75 | 85 |
| Bergen Coal and Oil | 25 | 40 |
| Second National | — | 90 |

### San Francisco Stock Market.

SAN FRANCISCO, January 5, 1870.

| (By Telegraph.) | 1st Board. | 2d Board. |
|---|---|---|
| Savage | 41⅝ | 42⅛ |
| Crown Point | 15⅛ | 15 |
| Yellow Jacket | 51 | 51⅛ |
| Kentucky | 1 43 | 1 42 |
| Chollar Potosi | 18 | — |
| Gould & Curry | 67⅛ | 68 |
| Ophir | 13⅜ | — |
| Alpha | 16 | — |
| Belcher | 15 | — |
| Imperial | 46 | |
| Hale & Norcross | 1 44¾ | 1 49 |
| Amador | — | — |

### London Metal Circular.

LONDON, December 17, 1869.

There has not been much activity in Metals this week, but the transactions have been over the average of the last two months.

COPPER.—Prices have given way a little, and we can report a very fair business at the slight reduction which has taken place. About 400 tons of Bars have changed hands at £66 5s., cash, and 1,900 tons of Regulus at 13s. In fine Foreign and English Raw Copper not much has been done, and annexed prices are not easily supported. But we think that there is a more healthy tone in the market, and as many of the smaller operators, and some of the large ones, have been clearing out their stocks, it is not so easy to execute special orders, and the time seems to be approaching when the smelters and large importers will again have the trade in their hands.

The mail from Chili, received on the 13th inst., advised charters, for the fortnight ending 2d Nov., of 3,050 tons fine Copper, viz.: 1,600 tons in Bars and Ingots, and 1,450 tons fine in Ores and Regulus.

TIN—Has been very weak every day since our last issue, and we close with a feeble market at our annexed quotations. Statistics are not bad, but the trade will not buy; those who are in it as speculators appear to have enough, and no new people seem disposed to go into an article which has so lately proved itself to be in such a rotten position. On the 15th inst. the smelters reduced their prices 3s. on Common and 6s. on Refined.

TIN PLATES.—There is a little more inquiry, but very few orders can be secured, the prices at which buyers will operate being so exceedingly low.

IRON.—Manufactured is not in so good demand, but Pigs continue to advance.

In Spelter and Lead there is nothing especial to

VIVIAN, YOUNGER & BOND.

### Praise of the Press.

THE JOURNAL IN PHILADELPHIA.

[From the Philadelphia *Commercial List*, December 18.]

"THE ENGINEERING AND MINING JOURNAL.—This highly valuable journal for the month of November, is on our desk, and it would be difficult to praise it beyond its merits. To practical business men, tradesmen and mechanics, it is worth ten times the price of subscription, which is only $4 per annum."

[From *The* (Dover) *Delawarean*, December 18.]

"THE ENGINEERING AND MINING JOURNAL.—We have received the November parts of this ably conducted and remarkably cheap scientific weekly, and can commend it to the favor of all who wish to be posted in the news of mining, engineering, mecanics and the arts. Each number contains sixteen large and elegantly printed pages, with illustrations of novelties."

[From the *Portland* (Me.) *Argus*, December 22.]

"THE ENGINEERING AND MINING JOURNAL is designed to promote the best interests of the engineering and mining public, by giving circulation to contributions from the pens of the ablest men in the professions. New machinery and engineering structures are carefully illustrated, and we judge from the monthly (November) part sent us, that it is a very valuable journal for those interested in mining and engineering."

[From the Trenton N. J., *State Gazette*, December 16.]

"THE ENGINEERING AND MINING JOURNAL is the best journal of its class that we know of. It is devoted, as its name implies, to the interests of mining and engineering, to the gathering of statistics and facts on these interesting subjects, and to descriptions of the latest great engineering projects, and the progress in our western domain of the great mining interests. The information which it gives during the year, for four dollars, is vast in quantity, and embraces much that is deeply interesting to all classes of the community."

### Another Flying Machine.

Since the burning of the San Francisco flying machine, the stockholders in the enterprise have decided to build a working model, building their faith upon the performances of the first machine. But another inventor in that city has also taken the field. His machine is described as follows: "It is made of light material, firmly bound together. There are two chambers for gas, conformable in size and shape with that of the main body or passenger saloon. It has an oblong shape, each end sharp, to offer as little resistance as possible to the air. It is to be propelled by a continuous blast of compressed air. Openings are left for the air, which, after having forced ahead, can escape without causing any counter force.

"A sort of capstan in the centre of the apparatus is held in the grooves of an upper and lower wheel. The transverse and longitudinal beams of the centre of this capstan being forced from right to left, or left to right, will steer the apparatus, causing it to pivot on its centre. The cap, or gas-chamber of the top, causes the ascension, being inflated, and moderates or lets it down; when the gas is allowed to escape by the valve placed at the two extremes. It is supplied with gas by two tubes placed forward, which receive it from the generator, which is placed in a room forward of the apparatus, in the top of the instrument, by which the compressed air is applied, and which overreaches the apparatus, and so keeps the top chambers from head winds. A tube starts from the lower gas-chamber, through the passenger room, meets the top chamber, from which another pipe starts and meets the cap, giving thus the power, in case of dilation, to diminish the expansive strength of the gas, and by that the top chamber is the receiver and dispenser of the force of ascent and descent."

### California Silk in Europe.

WE learn from the London (Eng.) *Anglo-American*, of October 30, that "the collection of silk cocoons in the scientific department from California at the late International Exhibition at Hamburg, received the silver medal of the society. At the Royal Linnean Society's show at Brussels (Belgium) the California Department received the great gold medal of the society. The specimens of cocoons and conifers were taken from the private collection of Mr. J. Q. A. Warren, at the request of the society, who had the honor of bearing off its first prizes. At Belgium, the particular attention of King Leopold was drawn to this collection, who greatly admired the contributions from California."

## MINING COMPANIES AND STOCK QUOTATIONS.

| GOLD AND SILVER COMPANIES. | SITUATION OF MINE. | SECRETARY AND PLACE OF BUSINESS. | CAPITAL. | PAR VALUE. | OFF'R'D. | ASKED. |
|---|---|---|---|---|---|---|
| Alameda Silver | | A. Queran, 108 Wall st | $2,000,000 | $10 00 | | |
| Ada Elmore | South Boise, Idaho | | | | | |
| American Flag | Nevada District, Col | P. P. Fullerton, 71 B'way | 600,000 | 10 00 | | |
| Atlantic and Pacific | Humboldt Co., Nevada | | | | | |
| Bates and Baxter | Colorado | | | 50 00 | | |
| Benton | Colorado | W. F. Drake, 15 Broad | 500,000 | 5 00 | 11 | 15 |
| Briggs | Colorado | J. P. Davies, 19 Cliff | 1,000,000 | 100 00 | | |
| Black Hawk | Colorado | C.T.Whittington, 48 Broad | 2,500,000 | 100 00 | | 40 |
| Bobtail | Colorado | J. Stanton, Jr., 25 Nassau | 1,000,000 | | | |
| Bullion Consolid'ed Gold | Colorado | | | | | |
| Burroughs Gold | Colorado | | | | | |
| Church Union Gold | California | | | | | |
| Consolidated Gregory | Colorado | | | | 1 75 | 1 85 |
| Combination Silver | Nevada | | | 100 00 | 1 50 | |
| Columbia Silver | Austin, Nevada | J. M. Brown, 155 B'way | 5,000,000 | | | |
| Commercial Silver | | J. E. Smith, 26 Pine | 3,000,000 | | | |
| Corydon | Gilpin Co., Colorado | J. Samuels, 40 B'way | 500,000 | | | |
| Downieville | Colorado | | 2,500,000 | 25 00 | | |
| Eagle Gold | Gold Dirt Dist., Col | J. P. Davies, 19 Cliff | 300,000 | 1 00 | | |
| Empire Gold and Silver | BodieBluff,MonoCo.Cal | H. K. Gates, 70 B'way | 1,000,000 | | | |
| Edgehill | | A. Fullerton, 71 B'way | 10,000,000 | | | |
| Esperanza Silver | | Ezra Clark, Jr., 13 William | 400,000 | | | |
| Fisk Gold | | H. Johnson, 195 Fulton | 500,000 | | | |
| Forest Queen | | E. B. Beet, 62 B'way | 1,000,000 | | | |
| Golconda Gold | Sherbrooke, C. E | H. Adams, 71 Broadway | 2,000,000 | | | |
| Gregory | Colorado | | 1,250,000 | | | |
| Gunnell Gold | Colorado | J. H. Rolston, 80 B'way | 1,000,000 | 50 00 | | |
| Gunnell Central | Colorado | C. B. Bostwick, 16 B'way | 3,000,000 | 10 00 | | |
| Gold Rock | | R. M. Lockwood, 93 Wall | 400,000 | | | |
| Grass Valley | | | | | 18 | 21 |
| International Silver | | J. W. Brazier, 26 Pine | 600,000 | | | |
| Hope Gold | Colorado | | 5,000,000 | | | 10 |
| Holman | | | 2,000,000 | 25 00 | | 10 |
| Kipp & Buell | Colorado | | 300,000 | | | |
| Knickerbocker Gold | | J. H. Rolston, 80 B'way | 200,000 | 100 00 | | |
| La Crosse Gold | Nevada Dist., Col | P. P. Fullerton, 71 B'way | 1,000,000 | | 14 | 17 |
| Lander Hill T. & S | Nevada | M.L.Catherwood,74 B'way | 1,000,000 | | | |
| Lewis Gold | Georgia | | 1,000,000 | | | |
| Liberty Gold | | | | | 1 | 3 |
| Manhattan Silver | Nevada | M. L. Ogden | 400,000 | | | |
| Maraposa common | California | Jas. H. Ferdon, 34 Wall | 12,000,000 | | 7⅛ | 8⅛ |
| Mariposa preferred | California | do. do. | | | 15¾ | 16 |
| Montana Gold | | G. De Cordova | 400,000 | | | |
| Montana M. L. & M. Co | Montana | A. M. Hoyt, 22 William | 250,000 | | | |
| Montrose | Clear Creek Co., Cal | W. W. Perkins, 71 B'way | 1,000,000 | | | |
| New York Silver | Nevada | Thos. Sproull, 78 B'way | 1,500,000 | | | |
| New York and Austin | Nevada | E. R. Siccomb, 70 Wall | 500,000 | | | |
| New York and Owyhee | Owyhee Co., Idaho | | 1,000,000 | | | |
| New York and Eldorado | | G. H. Munroe, 10 Wall | 2,000,000 | | | |
| N. Y. & Montana M. & D. | Montana | F. A. Chapman, 20 Nassau | 1,250,000 | | | |
| N. Y. & Silver Peach | Nevada | R. C. Root, 74 B'way | 2,000,000 | | | |
| N. Y. & Utah P. & M | | W. H. Mailler, 108 Wall | | | | |
| Ophir Gold | Comstock Lode, Nev | L. C. Warner, 70 B'way | 625,000 | | | |
| Owyhee Gold | | W. H. Smith, 43 Ex. Place | 1,700,000 | | | |
| Pahranagat Central | Nevada | J. E. Smith, 25 Pine | 6,000,000 | | | |
| Quartz Hill Gold | | F. Bernard | 2,500,000 | | 72 | 77 |
| Reese River Consol'd | Nevada | W. B. Ogden | 6,000,000 | | 67 | 69 |
| Rocky Mountain | Colorado | S. M. Pond, 70 B'way | 500,000 | 10 00 | 5 | |
| Rollins Gold | | Thos. Bond, 132 B'way | 600,000 | | | |
| Sensenderfer | Colorado | H. A. Shewill, 19 Broad | 1,000,000 | | | |
| Silver Bend | | F. W. Macy, 20 Nassau | 1,500,000 | | | |
| Silver Mt. Silver | | H. A. Moen, 71 B'way | 1,000,000 | | | |
| Silver Peak & R. M | Nevada | W. B. Ogden, 52 Wall | 5,000,000 | | | |
| Smith & Parmelee | Colorado | W. H. Hollister, 6 Broad | 2,500,000 | 20 00 | 1 75 | 1 85 |
| Social & Steptoe Con | | T. H. O'Connor, 24 Nassau | 450,000 | | | |
| Standard Gold | | C. B. Bostwick, 169 B'way | 500,000 | | | |
| Symonds Forks | | | | | 80¢ 40 | 75 |
| Twin River Silver | Nevada | J. F. R. Hadden, 20 Nassau | 800,000 | 100 00 | | |
| Texas Gold | Colorado | | 500,000 | 10 00 | | |
| Union Gold | Colorado | F. A. Potts, 110 B'way | 1,200,000 | | | |
| Wash. Mill & Silver | Nevada | W. W. Perkins, 71 B'way | 300,000 | | | |
| Wauba Yuma | Arizona | J. W. Silsby, 36 Pine | 6,000,000 | | | |

| COAL AND IRON COMPANIES. | SITUATION OF MINE. | SECRETARY AND PLACE OF BUSINESS. | CAPITAL. | PAR VALUE. | OFF'R'D. | ASKED. |
|---|---|---|---|---|---|---|
| American Coal Co | | M. A. Myers, 119 B'way | $1,500,000 | $25 00 | | |
| Ashburton Coal Co | | J. T. Rollins, 41 Pine | 2,500,000 | | | |
| Block House Coal | | D. B. Keeler, Jr., 43 Pine | 1,000,000 | | | |
| Brewster Iron | | H. Robison, 165 B'way | 150,000 | | | |
| Broad Top Coal & Iron Co | Pennsylvania | B. Love | 2,000,000 | | | |
| Cameron Coal Co | | J. A. Simpson, 40 B'way | 2,500,000 | | | |
| Carbon Hill Coal Co | | J. Silsby, 36 Pine | 1,000,000 | | | |
| Central Coal | | F. P. White, 111 B'way | 2,000,000 | 100 00 | | |
| Clifton Iron Co | | P. H. Riordan, 34 Pine | 1,250,000 | | | |
| Columbia Iron | | E. D. Webb, 77 Cedar | 1,000,000 | | | |
| Consolidation Coal | Maryland | J. S. Mackie, 71 B'way | 5,000,000 | | | |
| Crawford Coal | | E. Clapp, Prest, 137 B'way | 1,000,000 | | | |
| Cumberland C. & I. Co | | E. Kisean, 90 B'way | 5,000,000 | | 25 | |
| Derby Coal Co | | W. S. Davison, 11 Broad | | | | |
| Dover Coal and Iron Co | | L. Chase, 88 Wall | | | | |
| Del. & Hudson Canal Co | | | 10,000,000 | 100 00 | | |
| Ebervale Coal | | G.L.Stout, Treas.,111 Br'y | 500,000 | | | |
| Fall River Bituminous | | D. T. Blauvelt, 43 Pine | 1,000,000 | | | |
| Farrar Coal | | C. H. Jones, 43 Pine | 250,000 | | | |
| Fisher Iron Co | | M. Ellis, 19 William | 100,000 | | | |
| Hamp're & Balt. Coal | | S. M. Pond, 70 B'way | 500,000 | | | |
| Iron Cliffs Co | | C. J. Canda, 52 Wall | 1,000,000 | | | |
| Jackson Iron | | G. P. Loyd, 119 B'way | 300,000 | | | |
| Kemble Coal & I. Co | | R. A. Wight, 26 Ex. Place | 300,000 | | | |
| Keokuk Coal | | J. F. Franklin, 112 B'way | 100,000 | | | |
| Lackawanna I. & C | Pennsylvania | E. C. Lynde, 52 Wall | 1,200,000 | | | |
| Lewis Run C. & I. Co | | C. A. Sanborn, 80 B'way | 750,000 | | | |
| Lykens Val. Coal Co | | F. A. Platt, 13 William | 800,000 | | | |
| McKean Co. Bit. Coal Co | | J. H. Rolston, 80 B'way | 1,500,000 | | | |
| Lehigh & Susquehanna | | | | | | |
| Mahanoy | | | 400,000 | 100 00 | | |
| McNeal C. & I. Co | | C. C. Godwin, 71 B'way | 500,000 | | | |
| Mount Riga Iron | | G. M. Newton, 42 Cedar | 300,000 | | | |
| New Boston Coal | | C. H. Ogden, 55 B'way | 2,000,000 | | | |
| N. Y. Con. C. & I. Co | | A. T. Levine, 16 Wall | | | | |
| N. Y. & Lehigh Coal | | T. Simpson, 111 B'way | 150,000 | | | |
| Pacific Coal Co | | G. Wrighton, 34 Wall | | | | |
| Peekskill Iron Co | | W. Murdock, 7 Nassau | | | | |
| Pennsylvania Coal Co | | C. H. Mead, 111 B'way | 3,200,000 | 50 00 | | |
| Richmond Iron Co | | C. H. Smith, 165 B'way | 1,000,000 | | | |
| Scotia Coal Co | | I. N. Soper, 42 B'way | 2,500,000 | | | |
| Spring Mt. Coal | | C. Runyon, 111 B'way | 1,250,000 | | | |
| Springfield & D'p Run C | | E. D. Webb, 77 Cedar | 600,000 | | | |
| Stout Coal Co | | G. S. Comstock, 111 B'way | 500,000 | | | |
| Susquehanna & Wyoming | | E. Potter, 40 B'way | 1,000,000 | | | |
| Tannerdale Coal | | I. T. Ludlaw, 71 B'way | 250,000 | | | |
| Wash. Mutual Coal | | M. C. Baker, 117 B'way | 420,000 | | | |
| West Point Iron Co | | R. C. Brock, 110 B'way | 500,000 | | | |
| Wilkesbarre C. & I. Co | | W. H. Tillinghast, 80 Br'y | 3,400,000 | | | |
| Wyoming Val. Coal Co | | E. Potter, 40 B'way | 1,000,000 | | | |

| COPPER AND LEAD COMPANIES. | SITUATION OF MINE. | SECRETARY AND PLACE OF BUSINESS. | CAPITAL. | PAR VALUE. | OFF'R'D. | ASKED |
|---|---|---|---|---|---|---|
| Anita Copper | California | J. A. Ferguson, 8 Wall | | | | |
| Corinth Copper | Corinth, Vermont | S. H. Howard, 191 B'way | $500,000 | 25 00 | | |
| Davidson Copper | | | | | 3 | 25 |
| Eagle Harbor Copper | Michigan | W. H. Smith, 43 Ex. Place | 500,000 | 25 00 | | |
| Evergreen Bluff Copper | Michigan | F. W. Caper, 44 Ex. Place | 500,000 | 25 00 | | |
| Globe Copper | | R. K. Rickard, 19 Nassau | 200,000 | | | |
| Grand Portage Copper Co | | A. S. Kellogg, 22 Pine | 500,000 | | | |
| Guymard Lead | | Samuel Vernor, 38 Pine | | | | |
| Hilton Copper | | W. H. Smith, 43 Ex. Place | 500,000 | | | 75 |
| Hope Copper | | J. W. Davis, 19 Nassau | 500,000 | | | |
| Hudson River Copper | New York | T. Clarkson, 22 William | 1,500,000 | | | |
| Indiana Copper Co | | J. M. Mills, 25 Nassau | 500,000 | | | |
| Isle Royale Copper | Michigan | F. W. Caper, 44 Ex. Place | 1,000,000 | | | |
| Keweenaw Copper | Michigan | F. W. Caper, 44 Ex. Place | 500,000 | | | |
| Lake Superi'r Silver Lead | Michigan | A. S. Kellogg, 22 Pine | 1,000,000 | | | |
| Omiga Copper | Michigan | S. Cooper, 7 Pine | 500,000 | | | |
| Ridge Copper | Michigan | J. L. Gardiner, Jr., 43 Ex. P | 500,000 | | | |
| Rockland Copper | Michigan | A. Fullerton, 71 B'way | 500,000 | | | |
| St. Joseph Lead | Michigan | J. W. Jones, 6 Broad st, | 1,000,000 | | | |
| St. Marguret Copper | | E. P. Sutton, 43 Pine | 250,000 | | | |
| Schoolcraft Copper | | R. Walsh, 22 William | 500,000 | | | |
| Superior Copper | Michigan | A. Fullerton, 71 B'way | 500,000 | | | |
| Union Copper | | A. S. Kellogg, 22 Pine | 500,000 | | | |
| Vermont Copper | Vermont | J. C. Ely, 191 B'way | 500,000 | | | |
| Wallkill Lead, asst | | S. M. Pond, 70 B'way | | | 4 | |

| MISCELLANEOUS. | SITUATION OF MINE. | SECRETARY AND PLACE OF BUSINESS. | CAPITAL. | PAR VALUE. | OFF'R'D. | ASKED. |
|---|---|---|---|---|---|---|
| American Zinc Co | | W. E. Lawton, 19 Cliff | $1,000,000 | | | |
| Bigelow Blue Stone Co | | H. Bogardus, 14 Pine | | | 15 | 18 |
| Quicksilver | | | | | | |
| Covill B. L. M. & M'f. Co | | C. R. Bostwick, 302 Pearl | 250,000 | | | |
| Manhattan Marble | | H. K. Gates, 70 B'way | 300,000 | | | |
| N. Jersey Zinc Co | New Jersey | A. H. Farlin, 61 Maiden L'e | 1,500,000 | | | |

## The Significance of Certain Lines of the Coal Fields.

BY JAMES MACFARLANE, TOWANDA, PA.

THE variety in the kinds of coal found in different localities, suggests the inquiries as to whether it is fortuitous, or whether there is any general law by which it is governed; what is the law, and how is the effect produced? In a universe governed by law there must be some system to the coal formations. The facts observed by every one add to the general stock of knowledge, and may assist in solving interesting problems in regard to these important regions.

One of the most obvious phenomena in regard to our Pennsylvania anthracite coal fields is that the hardest coal is found in the east ends of the first and second coal fields, contrasting very strongly with the soft, free-burning semi-anthracite of their west ends. The line of gradations in softness might, at first glance, appear to be from east to west, and is so stated by Rogers and others, perhaps on account of these two fields lying nearly in that direction. But a little observation will show us that, in fact, the course of this progression is from the southeast towards the northwest. A line, crossing the course at right angles, and thus corresponding nearly with the general course of the Atlantic coast, would represent the breast, as it were, of the wave of change. Upon a geological map, the southeast-northwest course would first strike the stony anthracite fields of Rhode Island and Massachusetts, in which, under a high temperature and intense pressure, all volatile matter has been expelled, all vegetable impressions obliterated, and the color of some of the beds changed to a steel blue.

The next coal field, as we move the line north-westward, is the old Lehigh Navigation Company's mines near Mauch Chunk, then the Hazelton Beaver Meadow, and other upper Lehigh basins, before referred to, producing the hardest anthracite, which is of peculiar value for foundry purposes, in melting pig iron. A little farther north-westward comes the Pottsville coal, of a medium hardness; and here also, by our rule, we are in the line of the Great Northern, or Wyoming and Lackawanna coal field. This third coal field lies in nearly a northeast and southwest course, and according to the theory proposed, it should produce throughout its entire length from the entire seams, a nearly uniform quality of coal, as regards its hardness. This is found to be the case. If there is any observable difference, that produced by the Delaware and Hudson Coal Company in the north horn of this crescent-shaped field, should be a little the hardest, and that from the Nautioke and Shickshinny end, the softest. The coal produced in the central part of the field at Scranton and Wilkesbarre should, in obedience to our theory, be of the same general character as that from the same seams of the Mahanoy and of the widest portion of the Schuylkill basins. As we move our line farther north-westward, we also notice that it first passes the extremity of the southern fork of the first coal field, then that of the north fork, while the line has not much passed Shamokin in the second field, leaving the Trevorton end of that field, if our rule is a correct one, the softest of all the anthracite coal in the three regions—as it is known to be. It is thus described in the State Geological Report: "Passing the meridian of the Shamokin Gap, the coal acquires a sensible quantity of the inflammable gas, carburetted hydrogen, characteristic of the bituminous and semi-bituminous class of coals, and the proportion of this ingredient seems rapidly to increase as we draw near to the extremity of the basin. It seems to exist in the coal in the gaseous form, or if a portion is in a condition of liquid bitumen, it is in quantity too minute to cause the coal to soften and form coke. The coal is therefore to be regarded as an anthracite, but of modified properties."

It might have been noticed in passing that the character of the coal produced in the two prongs at the east end of the Schuylkill basins forms no exception to the supposed rule, being a little harder than the Shamokin, and softer than the Pottsville.

Passing northwest over an intermediate space in which no coal is found, we next meet with the detached semi-anthracite coal field on Birch Creek, in Sullivan county, Pa., which possesses the character which its situation requires, having the fracture and general appearance of semi-bituminous coal, but burning in all respects like anthracite of a soft, free-burning variety, being even softer than the Shamokin.

The semi-bituminous coal fields of Blossburg and Barclay, in Northern Pennsylvania, the next in order, and that of Broad Top in the southern part of the State, and the Cumberland coal region in Western Maryland, as well as the intermediate ones of Snow Shoe and Phillipsburg, Pa., all produce coal of the same general description, and all lie in the same northeast and southwest course, forming a series of islands near the great continent of bituminous coal. This zone of coal is of a transition kind, and the changes seen in all coal elsewhere, southeast or northwest of this line, seem to show that this is the only part of the country in which this peculiar quality of dry semi-bituminous coal, making a good hollow fire for the blacksmith, may be expected to be found; but it might be looked for anywhere on the east side of the Alleghany coal field southwest from Cumberland, Md., even down to Chattanooga or Tuscaloosa, Alabama, although the southern extension may represent a more central part of that great field.

The insulated character of these semi-bituminous fields does not permit us to fix their original width, but it seems to extend into the southeastern edge of the main body of the Alleghany field, near Cresson, and becomes more bituminous towards Johnstown. The great Appalachian coal field, in Pennsylvania, is divided into six or more coal basins, running in a northeast and southwest course. Each of these long, narrow basins might be expected to produce the same general characters of coal, which would differ from each other as we go northwest. This, however, can only be proved by the results of practical mining, which has not been sufficiently extensive on the same seam of coal to verify this rule. The mining done in the north, on the line of the Philadelphia and Erie road, is on the lower seams of the lower coal measures, while that in the southwest of Pennsylvania is on the Pittsburgh seam of the upper coal measures.

But as we approach the northwest corner of this coal region, we find two or three distinct kinds of coal. The first is the cannel coal along the Alleghany River, which, before the discovery of the oil wells, was extensively used for the manufacture of kerosene by distillation. The cannel coal of Breckinridge county, Kentucky, in the southern part of the great Illinois coal field, is of a similar character; and was among the first that was used for the same purpose. It is situated in a southwest direction from the former, and probably is in the same original coal basin.

In the northwestern part of the Alleghany coal region, near the State line at Youngstown, Ohio, and about Sharpsburg, on the Pennsylvania side, is found another peculiar and very valuable laminated splint coal, known in the region as "block coal," highly esteemed for smelting iron in the Mahoning valley. It also commands a large market at and from the ports of Erie and Cleveland, as a grate and steam coal in the West. The Big Muddy coal, mined at Carbondale, Ill., and brought out to Grand Tower, on the Mississippi River, below St. Louis, and that at Chester, are of a quality very similar to the celebrated Ormsby and Brier Hill coal above described, and lie nearly in a southwestern direction from the Youngstown and Sharpsburg region. The Big Muddy coal is also used with success in smelting iron. All of these are from the lowest seam in the series.

A good quality of coal is said to occur at Brazil, between Terre Haute and Indianapolis, on the east edge of the Illinois coal field, which has been successfully used in blast-furnaces in Chicago. This may represent another grade of coal in the Alleghany field, which is mined and used in the same way near Massilon, Ohio.

Moving our parallel further northwestward, we come into a zone of inferior coal, mined at Jackson, Michigan, and at Belleville, Illinois, St. Louis being supplied from the latter. Also, further northwest, we have that produced along the northern part of the Illinois coal field, at Wilmington and La Salle, and southwest from them is Bevier, in Missouri, five miles west of Macon, on the Hannibal and St. Joseph railroad. They are equally sulphurous, and contain so large a percentage of hygrometric moisture as to fix them in the same class beyond question.

The Nova Scotia and New Brunswick coal regions are in the same coal-parallel with some parts of the Alleghany regions, producing bituminous coal of the same quality. The supposed meridian line, when traced for long distances, like all nature's lines, probably assumes a curving form, conformable to the great flexures of the continent.

It might be tedious to give further details, and the foregoing are sufficient to prove, at the least, a very remarkable series of coincidences. Others may have observed the peculiarity referred to as to these zones of coal, but the writer has never seen it noticed, and he will thank any one who will give him any additional facts relating to this subject. To ascertain and verify the rule is most important: the cause may be a matter of opinion. But it will readily be seen that if repeated observations should establish a law governing the formation of the same general description of coal along certain known lines, it might be of the utmost importance in enabling us to judge, in some measure, of the character of the coal to be found in undeveloped regions. The writer may hereafter give his theory as to the origin of the phenomenon described.

## Some Occurrences of Native Copper at Keweenaw Point, Lake Superior.

Translated from the German of Professor HERMANN CREDNER, of the University of Leipsic, by MAX MOELLER, M. E.

### II.—THE DEPOSITS OF THE COPPER FALLS MINE.

The Copper Falls mine is situated about twenty to twenty-five miles north of Portage Lake, at the point where the horn-like peninsula of Keweenaw Point changes its northeastern direction into a more eastern one, on the northern decline of the melaphyr and amygdaloid zone near its boundary towards the overlying conglomerate and sandstone. The latter, as well as the bedded melaphyrs, strike east and west, and dip 25° north, so that a vertical section from south to north would show the following series:

*(a.)* Melaphyr, dark-brown, crystalline, fine grained, very hard with splintery fracture, containing small nodules of iron-chlorite, and now and then a few amygdules of calcspar. It all at once assumes—

*(b.)* Amygdaloid structure, thus forming an amygdaloid zone, connected below with the just described melaphyr by sudden transitions, but distinctly bounded above. Its upper boundary is not level, but undulates, presenting deep saddles and high ridges. This amygdaloid bed has an average thickness of twenty feet, and is sub-divided into two zones; the lower one containing only calcspar amygdules and small nodules of iron-chlorite, while the upper, eight feet thick, carries in its amygdules copper, either alone or accompanied with calcspar. These copper amygdules, from the size of a pin-head to that of a pea, occur either insulated in the matrix, or in clusters, connected by small wires. Silver likewise occurs either as sole substance of the amygdules, or together with copper. The upper part of this cupriferous amygdaloid zone contains five to ten per cent. of the metal, and is sharply bounded towards the already mentioned—

*(c.)* Massive or earthy melaphyr, of a reddish gray color. But even this shows in stripes amygdaloidic structure. Compared with the amygdules of the above described amygdaloids, which are round or oval, and rather small, those of the younger melaphyrs have a cylindrical or spiral form, attain a length of two feet three inches, with a small diameter, stand at right angles to the cleavage, and are called "copper-nails" by the miner, if they are filled with copper. Cavities of the same remarkable shape are still more frequently found filled with calcspar. These peculiar amygdaloids are, however, limited to the lower part of the melaphyrs, following upon the amygdaloids described under *(b.)* These melaphyrs, which may have a thickness of four hundred feet, are distinctly stratified, and are sharply cut off below by—

*(d.)* A stratum of dark-green, soft, chlorite mass, only a few feet thick. This mass is filled with irregular "vugs," up to fist-size, lined with analcime crystals, which are interesting, aside from their perfect angles, on account of their different colors. Most of them are coral-red; others, close beside these, are white and transparent; others white and cloudy, flecked with red; and others still are dark-red inside, but have transparent edges. Projecting out of these analcime druses are prisms of mesotype, with octahedral ends. The mesotype is, however, older than the analcime, since sometimes small crystals of the latter sit upon it. This chloritic mass is followed by—

*(e.)* A series of stratified melaphyrs about one thousand feet thick, which have now and then an amygdaloidal type, and also alternate with genuine amygdaloid strata. The color of this melaphyr represents different shades of reddish brown; its texture is fine-grained, earthy or dense, and the amygdaloidal cavities are filled with calcspar and iron-chlorite, but do not contain any copper. They form the upper layers and the northern slope of the melaphyr reef, which stretches, as I have said, along the whole peninsula of Keweenaw Point.

*(f.)* These are covered by a series of conglomerates, striking east and west, and dipping 28° north; they are exposed for about three thousand feet, and resemble the "Rothliegen des," from Thuringia. Besides these conglomerates, there are the thin stratified brown-red sandstones, forming the banks of Lake Superior.

This whole series of melaphyrs, amygdaloids, conglomerates and sandstones is crossed by a lode, the "Owl Creek vein," at right angles to their course. The vein is vertical, strikes north and south, and is filled with—

1.—Calcspar, white, reddish, or light-green; crystals of many faces are rare. It is associated, and intimately aggregated, with comparatively small quantities of—

2.—Quartz.

3.—Laumontite, blood-red when fresh, but very soon blackening and crumbling.

4.—Light-green epidote, and—

5.—Chlorite in single scales and threads occur, however, more frequently.

6.—Copper, from the finest scales to masses of two hundred tons. These enormous masses consist of a large number of scaly, dendritic, or jagged parts, close together, in many points actually aggregated, and also connected by threads. These rich sections form a chimney, which attains a thickness of twenty feet, by one hundred and twenty feet in length, and dips south, in the plane of the vein. From a space of this rich section, sixty-five feet high, about one thousand tons of native copper were extracted. The workings in this vein have established the fact that it is very poor above the cupriferous melaphyr-amygdaloid, and that those rich sections occur just below that rock. The copper often shows polished impressions of quartz-crystals, and then glitters in all shades of red.

7.—Silver is here rarer, and occurs in the form of small scales upon the copper.

8.—Characteristic of the "Owl Creek vein," are the melaphyr fragments scattered through its gangue. They have sharp edges, vary greatly in size, are sometimes enclosed in calcspar, and sometimes supplant the latter altogether, so as to form the gangue, which is then only traversed by thin threads of calcspar. These sections of the vein, rich in fragments of the country rock, seem to be the very ones to which the occurrence of the largest masses of copper is limited. The thickness of this calcspar copper-vein is not the same throughout, but varies from a few inches to twenty-eight feet. The vein seems to be richest where it is widest, and nearly barren where it contracts. For the most part, it is distinctly bounded by clay selvages along the walls; but where fragments of the country rock abound, and the gangue of calcspar almost disappears, the boundary lines are hard to determine.

The foregoing description shows that the mineral deposits worked in the Copper Falls mine represent two characters: a stratum of melaphyr-amygdaloid, eight feet thick, and containing copper in its amygdules; and a vein, attaining a thickness of twenty-eight feet, consisting of calcspar and quartz, with fragments of the country rock, traversing the stratified melaphyrs and amygdaloids, and containing ponderous masses of native copper. These masses only occur in those parts of the vein directly below the cupriferous amygdaloids, and then form a chimney in which the richness of the vein seems to be concentrated.

Mining and surface workings have demonstrated the fact that the contents in copper of the amygdaloid-bed is not dependent upon the presence of the vein, but a matter quite by itself.

## Black for Porcelain Painters.

IN connection with porcelain painting, we may notice the mention by BOTTGER, of the use of iridium and rhodium compounds for producing an intense black upon porcelain. The material commonly used, which he tells us is a mixture of oxide of iron and oxide of copper, gives very unsatisfactory results. Iridium has now been in use in the Royal Porcelain Works at Berlin for some time. The cost of the new color will be considerable, but a little of it will go a long way.

# THE ENGINEERING AND MINING JOURNAL.


CONTENTS FOR THIS WEEK.

[*Illustrated Articles are marked with an asterisk.**]


| | |
|---|---|
| *New Rotary Quartz Mill | 17 |
| The United States Mining Law | 18 |
| The United States and Asia | 19 |
| Carbonic Acid Gas, The Fire Extinguisher | 20 |
| Ingenious Engineering | 20 |
| MINING SUMMARY | 20 |
| BUSINESS AND PERSONAL | 21 |
| MARKET REVIEW | 22 |
| Mining Companies and Stock Quotations | 23 |
| The Signigcance of Certain Lines of the Coal Fields | 24 |
| Some Occurrences of Native Copper at Keweenaw Point, Lake Superior | 24 |
| Black for Porcelain Painters | 24 |
| EDITORIALS: | |
| High and Low Steam | 25 |
| Power for Stamp-Mills | 25 |
| Robinson District, Nevada | 25 |
| New York Gas | 25 |
| Hydrogen and Iron | 25 |
| Queries | 25 |
| ADVERTISEMENTS | 25 |
| Celestial Phenomena | 26 |



ROSSITER W. RAYMOND, Ph. D., Editor,

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### Publishers' Notice.

Bound copies of Volume VIII., containing THE ENGINEERING AND MINING JOURNAL from July to December, 1869, are for sale at this office, until further notice, at $4 per copy. The price, as our readers are aware, is usually advanced as the copies grow scarcer; and we would therefore advise all who intend to keep a complete set of the JOURNAL, to send in their orders at once.

WESTERN AND COMPANY.

### High and Low Steam.

A contemporary recently published, under the above heading, one of the most curiously jumbled attempts to apply arithmetic to the theory of the steam-engine, which we ever had the amusement of perusing. The writer commences by saying that "as engineers and men of science are far from agreeing on this subject, he will lay before his readers what he believes the only manner of viewing the whole matter." Then follows a definition of steam-engines, by which we are informed that "the source of their work is the elastic force of the steam, formed by water raised to a high temperature in closed vessels, and tending to escape with a power, which imparts motion to certain appliances, acting in certain directions," etc., etc. Our appetite is further sharpened by learned allusions to GALILEO, TORICELLI, PAPIN, NEWCOMEN, COWLEY, SAVARY, etc., and by the assertion of the venerable truths that "we cannot create nor extinguish force;" that we can only "convert one mode of force or motion into another, and this again into another, one of which is known as mechanical work;" and that "the steam-engine converts heat into mechanical work." Thus far the author is only open to the criticism bestowed upon the katydid: "Thou sayest an undisputed thing, in such a solemn way." But after showing that practically a steam-engine gives for 16,875 Centigrade (corresponding to 30,075 FAHRENHEIT) units of heat per minute, one horse-power, and therefore 65.2 foot-pounds or units of power per FAHRENHEIT unit of heat, an attempt is made to obtain the theoretical equivalent for the unit of heat from this number, by multiplying it by 14.706, the pressure of the air in pounds per square inch. The product, 959, (we reduce all the thermometric numbers to FAHRENHEIT units, in order to make them correspond with our former articles) is asserted to be the theoretical equivalent of a unit of heat; and this multiplication of heat is said to be performed, in order to reduce the atmospheric pressure to zero! After this, it is scarcely surprising to hear that a horse-power is in reality obtained by the evaporation of 20.25 pounds of water, and that theoretically it should require only two and a half pounds of coal to evaporate 26.49 pounds of water, from 32° FAHRENHEIT into working steam; that there is thus a waste of 6.24 pounds of water evaporated—equivalent to 7,154.78 FAHRENHEIT units of heat, which is a loss of 23.55 per cent. of the original 30,375 units producing a horse-power, and that therefore 23.55 per cent. must be added to the 958 foot-pounds, making it 1184.33 foot-pounds for the final correct equivalent of one unit of heat. What this all means, we are not very successful in finding out. Perhaps our readers will succeed better.

But where are RUMFORD, MAYER, JOULE, GROVE, HELMHOLZ, and the host of others who for many years have made the most laborious experiments to determine this equivalent? They may now throw all their labors aside. Our contemporary has discovered that they are all wrong, notwithstanding they all agree in finding seven hundred and seventy-two foot-pounds as the mechanical equivalent of a dynamic unit of heat, and that the true mechanical equivalent is some fifty per cent. higher. Moreover, he has discovered that all this experimenting is needless trouble; multiply simply the practical effect of any steam-engine by the atmospheric pressure per inch (why not per foot?) and you have probably got what you want, but when this number is not big enough, add twenty-five per cent. or more, on any pretext you choose!

It appears to us that the writer of this article is the very "engineer or man of science" who is "far from agreeing on this subject." We advise him earnestly to study the series of articles which we have during the last six months published in this JOURNAL, concerning The Unit of Heat; Latent Heat; Heat by Combustion; Relation of Heat and Power; Calculation of the Power of Steam; High and Low Pressure; Theory and Practice of the Cut-off Valve; Nominal and Actual Horse-Power; etc.

### Power for Stamp Mills.

WE frequently hear extravagant claims put forth by the manufacturers or owners of stamp-mills, as to the amount of work performed by the employment of a given horse-power. A mill of so many stamps is said to run at such a speed, on so many horse-power. We desire to offer a simple suggestion, by which these assertions may be tested.

The power applied to a stamp-mill is expended in lifting the stamps, and in moving the intermediate machinery. The amount of power required to lift a stamp is exactly the same as that which the fall of the stamp generates. It follows that in no case can a stamp-mill be run with less power than the stamps themselves yield in dropping. The only saving of power possible is that which can be effected by reducing friction and weight of gearing.

For instance, a battery of ten stamps is run at ninety drops per minute, the stamps weighing six hundred pounds each, and dropping eight inches, or two-thirds of a foot. The force required to lift six hundred pounds eight inches, is four hundred foot-pounds, and this being done ninety times per minute, gives thirty-six thousand foot-pounds per minute for each stamp, or three hundred and sixty thousand foot-pounds per minute for the battery. Now, thirty-three thousand foot-pounds per minute is one horse-power; hence a battery of ten six hundred pound stamps, dropping eight inches, cannot possibly be run at ninety to the minute with less than 10.9 horse-power, aside from the power lost in the machinery itself.

The actual useful effect of the stamps may be increased by judicious arrangements. It may be found more economical to run at one speed than another. The character of the rock, the nature of discharge, and the fineness of the pulverization, affect this question. Yet, on the whole, there is a remarkable uniformity in the results achieved. Mr. ASHBURNER, of San Francisco, found some years ago, by comparing the work of a large number of quartz-mills, that they crushed, on the average, of ordinary rock, one and one-quarter tons per horse-power developed by the falling stamps; and recent investigations of our own lead us to accept this conclusion. Inventors may claim a saving of power by simpler applications of it, or an increased result in amount of rock crushed per horse-power applied, and prove their claims if they can; but when they propose to lift stamps to certain heights at a certain speed, they must be careful not to put the power too low, as the simple calculation we have given will inevitably expose the fallacy.

### Robinson District, Nevada.

THIS district, which, in the judgment of some, surpasses any other in the State for quantity and general character of its ores, is situated thirty-five miles due east from White Pine. It was discovered in the winter of 1867-'8, (about the same time that Treasure Hill was discovered), by four old experienced miners, who made thirty-six locations within an area of four miles square. The discoverers were all poor men, unable to develop their mines beyond what they could accomplish by their own labor; in fact, while one or two would remain in the district at work, the others would work by the day in other mines, until they could accumulate a load of provisions, when they would return to their own district. They have thus stood guard alternately over their property up to the present time, hoping that, by the sale of a portion of it, they might be enabled to develop and hold the balance.

White Pine attracted all the attention and nearly all the capital of the country, last spring, and the great financial *fiasco* of last July and August, coupled with disappointments of the White Pine enthusiasts, have conspired to leave Robinson district about where it started two years ago.

Such are the facts of its brief history. The district is situated in a range of hills rather than mountains, the highest of which is not more than five hundred to six hundred feet above Steptoe valley, which bounds the district on the east. A wagon may be driven easily to any of the mines now. So much for their accessibility. Within four miles of the most distant mine is a fine water power, furnished by a never-varying spring of fifteen hundred miner's inches, with a fall averaging one hundred feet to the mile. Competent millwrights estimate its capacity at three hundred horse power the year round. The thirty-six mines mentioned control one-half of this water. There is an abundance of wood (pine and cedar) surrounding the mines. To give an idea of it, it may be stated that parties are prepared to contract to furnish from ten thousand to fifty thousand cords for four dollars per cord—just half its cost in White Pine. A fine body of timber, within twelve miles, furnishes a pretty good quality of lumber at seventy dollars per thousand feet—two steam mills being engaged in its manufacture. It cost from three hundred to five hundred dollars per thousand at White Pine last January. Thousands of tons of hay, at fifteen dollars per ton, and pasturage for one hundred thousand head of cattle, can be had within ten miles, over the finest natural road (foot hills) in the State, dry and hard at all seasons.

These are the main features of practical interest surrounding the mines. And now as to the mines themselves: The veins are extensive, well defined, and remarkably uniform in quality. Incredible as it may seem, there are several lodes, (traceable for several thousand feet on the surface), averaging more than one hundred feet in width. Their general course is northeast and southwest. The ore is quartzite, interspersed with galena, copper, fluor-spar, etc., etc. They smelt readily, and by judicious mixing require no flux beyond that contained within themselves.

It would be easy to furnish twenty thousand tons of smelting ores, to average at least twenty-five dollars per ton in silver, besides the lead, copper, and gold. There is abundance of the best fire clay. A short time ago, two hundred and twenty pounds of antimonial galena ore from the Old England mine, treated at Bradshaw's works, on Main street, Chicago, yielded two hundred and forty-six ounces of lead and silver. The value of silver per ton of metal was ascertained to be five hundred and sixty dollars.

Robinson district, although comparatively unknown, is to-day one of the most promising districts ever discovered, in all the concomitants necessary to successful mining. G.

### New York Gas.

ONE would think, to read the scientific discussions of various processes for making gas, that there was some great difficulty of a technical character in the way. The public groans and grumbles over its detestable light; and is quieted with learned disquisitions from chemists. No doubt this is all valuable: the opinions of Messrs. CHANDLER, WURTZ, SILLIMAN, and their compeers, can scarcely fail to be worth hearing; but we would like to have light enough in our office to read their reports; and we insist, that while the gas companies are experimenting with chemical subtleties, they shall furnish consumers with good gas.

What is good gas? A recent German writer, who is not above the practical view of the question, lays down the following as the necessary qualities: 1. The gas ought to possess a normal illuminating power. The exact determination of the value of the normal illuminating power can only be obtained when the gas made from various qualities of coal, and manufactured according to rational principles, is compared, under exactly identical conditions, with the normal standard candle. Any gas which, by a combustion of five cubic feet per hour, exhibits a light equal to fifteen spermaceti candles, may be considered a gas of good illuminating power. 2. The gas should be absolutely free from hydrogen. 3. The pressure of the gas at the works and in the leading mains should, as a minimum, amount to from 0.8 to 1.0 of the water-pressure gange.

If this is good gas, then we do not receive the article in New York. Yet the Brooklyn Company is able to furnish consumers with something that far more nearly satisfies the above conditions. If the monopolies which control New York cannot settle upon "cheap" processes, let them try dear ones. Above all, let them adopt the easy expedient of using better coal, and maintaining a higher pressure.

### Hydrogen and Iron.

A NEW process for the purification of iron, invented by Mr. ENNIS, of Philadelphia, is briefly noticed in another column. We call the attention of manufacturers to its peculiarity, which consists in removing sulphur and phosphorus by means of hydrogen. Mr. ENNIS has promised us a communication, explaining the principle applied.

### Queries.

L. R., OF PA.—Your question concerning the galvanizing of iron plates, will be answered in the February number of the MANUFACTURER AND BUILDER.

A. H. M.—Mineral oils are destructive to rubber; coal oil is very much so, since it contains the true solvent of rubber, benzole. Animal and vegetable oils are in general less destructive, and some of them not at all so.

W. H. S., OF TEXAS.—A circular wood-saw, to be driven by foot-power, must be small, if you would be able to drive it at all. One of twelve inches diameter is rather too large to be operated successfully in this way, no matter how large a fly-wheel you attach to it.

J. H. G., OF TENN.—Oil in your boiler to prevent incrustation, may do good in some peculiar conditions of the water used, but in general soda is better; and best of all is the catechu, formerly called *Terra Japonica*, which is the chief ingredient in most patent anti-incrustation powders.

J. B., OF MASS.—Cold solders are nothing but alloys of tin and mercury, with which the metallic surfaces to be soldered together are first amalgamated by friction, after thorough cleaning. The amalgam is then applied with pressure of the pieces and the latter are allowed to rest for several days.

T. K., OF N. Y.—Palm oil is highly esteemed by soap manufacturers, because its saponification is easy, and it makes with soda very good hard soap of a fine yellow color. Butter is only used for soap-making when too rancid for anything else, and in no case can a hard soap be made out of it.

O. C., OF N. Y.—The Persian insect powder, now sold in some stores, is nothing but the powdered leaves and flowers of a medicinal plant, called *Pyrethrum caucasicum*. The root is commonly used in medicine, and the alcoholic extract of it, which has a benumbing effect, is on that account som etimes used by dentists, who put it into the cavities of teeth before plugging. The plant benumbs small animals, to such a degree that they never come to life again.

DISTILLER, OF BROOKLYN.—One of the common ways to remove from brandy and gin the fusel-oil taste, is to add a little oil of sweet almonds, shake and distil again. The latter oil will retain the fusel-oils, and the spirits be free of them.

### Celestial Phenomena.

DURING the past year, the accounts of one phenomena after another have succeeded each other with a rapidity which is startling. Earthquakes have been common occurrences; volcanic eruptions have come to be expected as items of daily news; an eclipse, such as is but rarely to be seen, has taken place; and several interesting meteors have been observed. There comes now the description of a strange discovery which has been recently made, and which transcends almost all the wonders which have been manifested since the apparitions in the heavens which were seen previous to, and appeared to foretell, the fall of Jerusalem. In the Southern skies, Australasian astronomers have long watched with interest a singular object. Of a class with the remarkable nebula which surrounds the constellation of Orion in our own hemisphere, the "nebula in Argo exceeds it in brilliancy almost in the same degree as the sun does the moon." The Orion nebula can be seen only on the darkest nights, but that of Argo shines as gloriously as a star of the third magnitude, "and is scarcely obliterated by the effulgence of the full moon."

This splendid object has been, of course, greatly noticed, but, nearly a year ago, a report came, taken from the observations of a small telescope of five inches aperture, that the wonderful mass was changing entirely in character. Sir John Herschell avers that this information was of a most important character; proceedings were immediately taken for hastening the completion of the great Melbourne telescope, which is a reflector of four feet in diameter—and this is now at work. The news coming from it more than confirms the previous intelligence.

It seems that the nebula has not only changed in form, but has actually shifted and drifted about the heavens, while the stars connected with it have retained their positions; apparently showing that the nebular and stellar systems are unconnected, and at different distances from the earth.

But on closer inspection a far more wonderful phenomenon than the shifting, strange though it is, of the beautiful nebula was discovered. The star Eta Argus, which is said to be the most wonderful object in the whole heaven, has undergone an apparently miraculous metamorphosis in brilliancy. This star was marked in Halley's catalogue as a fourth-rate; in Lacilles,' two centuries later, as of the second magnitude; in 1843 it surpassed every star in the heavens except the Dog Star. At present it cannot be seen at all with the naked eye.

Without going deeply into the causes of these extraordinary manifestations, it appears probable that the singular electric commotions which are at present going on in the chromosphere of the sun are not unlikely to have exercised material influence on the brightness of the stars. It is well known that there is at present a large current or column of electric light shooting out to an enormous distance from the verge of the sun's atmosphere, and it may be that the reflection which certain of the nearer stars must naturally take from this pillar of light may have the effect, not only of bringing themselves into extra brilliancy, but of dimming and casting into shade stars of greater distance from our earth.

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- II.—The Mother Lode of California.
- III.—The quartz and placer mines of Nevada County.
- IV.—Giant powder and common powder.

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- Chapter V.—Present condition and prospects of the Comstock mines.
- VI.—Ormsby, Washoe, and Churchill Counties.
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- VIII.—Nye County.
- IX.—Lincoln County.
- X.—Esmeralda County.
- XI.—Humboldt County.

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- XIII.—Population, property, railroad, etc.
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- YV.—Quartz mines.
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- XXVII.—The code of France.
- XXVIII.—Mining law of Switzerland.
- XXIX.—Mining law of England.
- XXX.—Mining regulations of Australia.
- XXXI.—Mining laws of Canada.
- XXXII.—Conclusions.

SECTION VII.—*Mining Education:*
- Chapter XXXIII.—Means of disseminating information with regard to mining and metallurgy; the National School of mines.

SECTION VII.—*Mining Education—Continued.*
- Chapter XXXIV.—The Freiberg School of Mines.
- XXXV.—The Paris School of Mines.
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" Splitting of (plans)
" One current of (plans)
" One current of, and how to adopt separate currents (plan)
" Dividing of, but not into "separate and and distinct" current (plans)
" Crossings (see H on plans)
" Weight of in shafts
" How to find the weight of
" Table of pressure in shafts
" Expansion of
" Its velocity and force
" Rush of, into each division
" Quantity produced by natural ventilation
" Splitting, why it should be adopted
" Splitting, why the workmen object to Mr. Hopton adopting the mode
Anemometer, measurement of air by, engraving of
Area of a pit, how to find
Barometers, Showing the time of an outlet of gas in mines (engraving)
Bricks, how to find the number in the walling of a shaft.
Buddle's plan
Circumference of a pit, how to find
Coal, several ways of working it out, and why man methods of working it out are adopted
" Working out in banks (plans)
" Working it out in following up banks (plan)
" Working out in pillars (plans)
" Working out in long wall (plans)
" Working out in drifts (plans)
" Working out with no regularity (plan)
" Working out by the "end way" or in endings (plan)
Cubical Contents of a pit, how to find
Dialing, the mode of
Dials, several engravings
" How constructed
" How fixed in mine surveying
" Needle, its variations
Diameter of shaft
Dip of mine, how to find and lay on (plan)
Explosion, the power of an
" At Lund-hill, in what part of the mine it was supposed to take place (plan)
" How the power may be diminished
Furnace, how to find the horse-power of
" The place of fixing, to produce the largest ventilating current
" Engravings of ground floor, front and back view
" Remarks upon
Gases, (carbonic acid) composition of
" Do. properties of
" (After, or choke damp) composition of
" (Carburetted hydrogen) do.
" Choke damp and carbonic acid, not one and the same in quality
" The effect produced on people by inhaling such
" The quantity required for an explosive mixture
" The elasticity of
" The weight of
" The nature and quality of
" Why some mines generate and produce more than others
" Why some mines generate a mixture of
Goaf, or gob, how tramrods are made through (plan)
Lund-hill (plan)
Managers, who are best competent to manage mines
Miscellaneous questions
Natural ventilation
Planning, how workings are laid on the plan
Regulations (see R on plans)
Safety Lamps, why flame will not penetrate through, engraving of
Sections on mechanical ventilation
Summary of accidents
Surveying, how mines are with the dial
Surveying, how mines are with the theodolite
Tables of weights and measures
Temperature on surface
Temperature in mines
Temperature, difference of between down and up-cast
Theodolites for mine surveying
Theodolites, how constructed
Theodolites, the magnetic needle dispensed with, and how workings are laid on plan, with Theodolite surveying
Theodolites, how mines are surveyed with them
Up-cast larger than down-cast (plan)
Ventilating mines by mechanical power
Ventilation, several ways of
Weather, how a change of affects the workings
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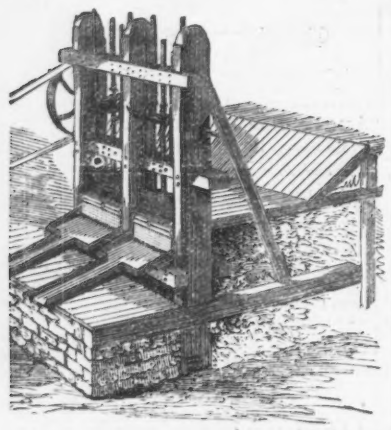

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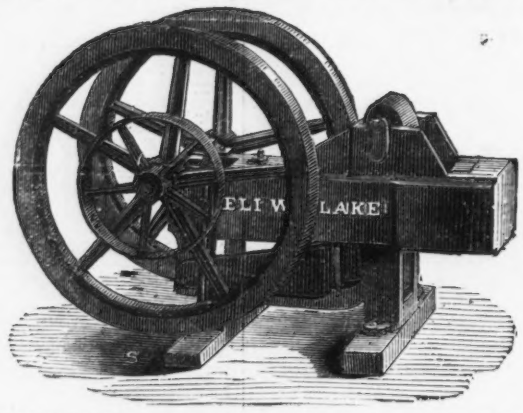


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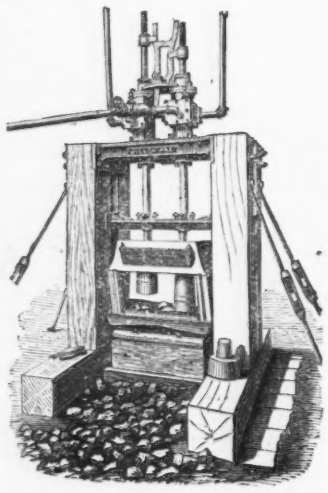

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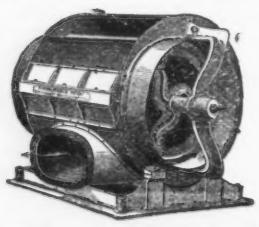

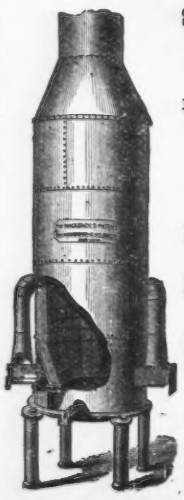

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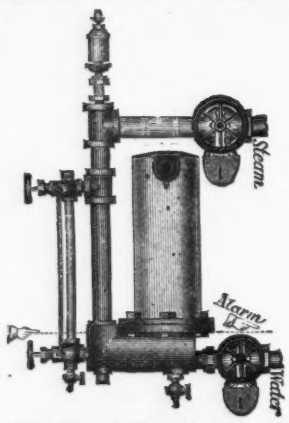


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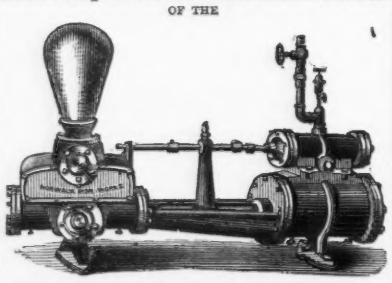

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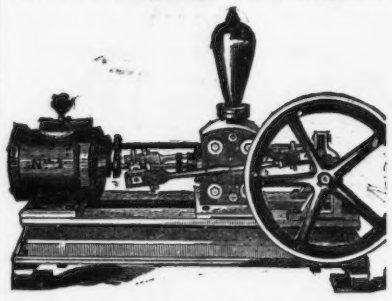

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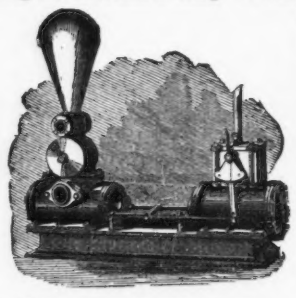


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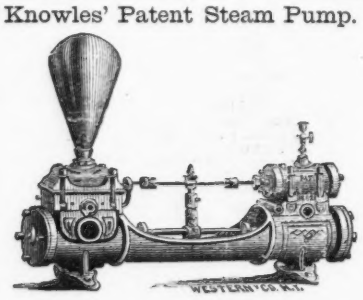

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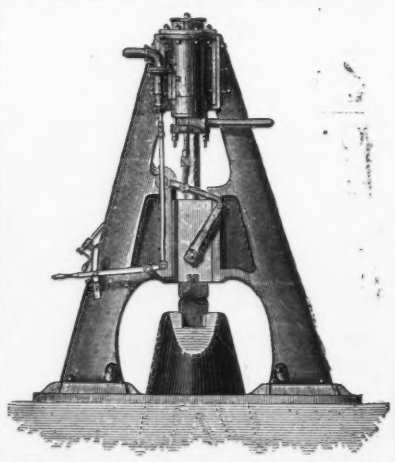

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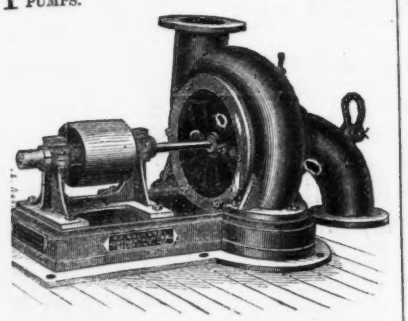

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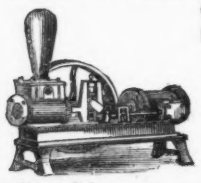

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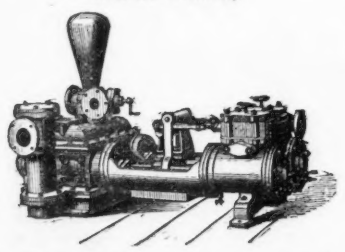

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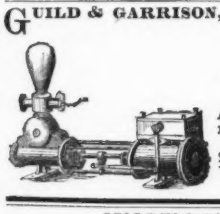

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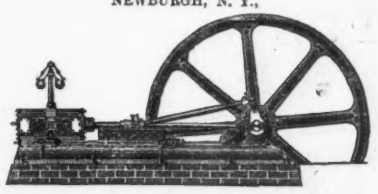

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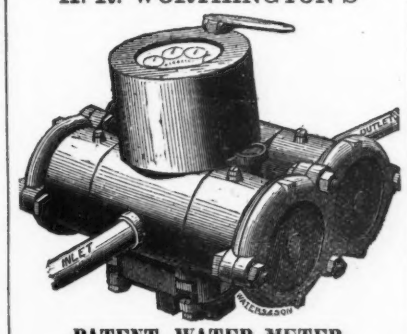


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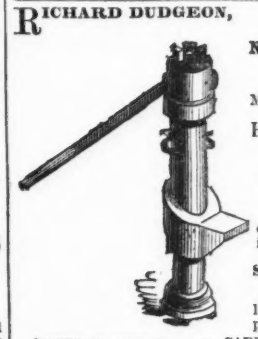

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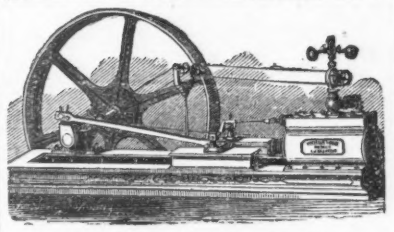

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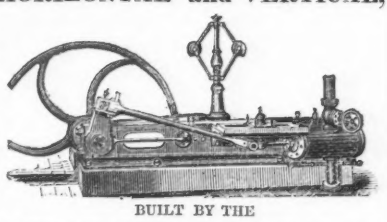

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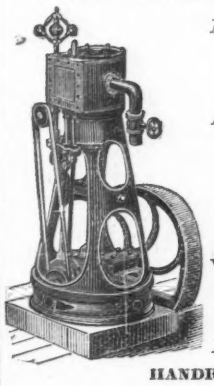

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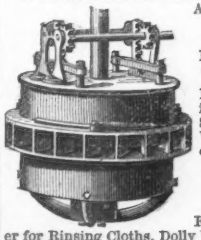

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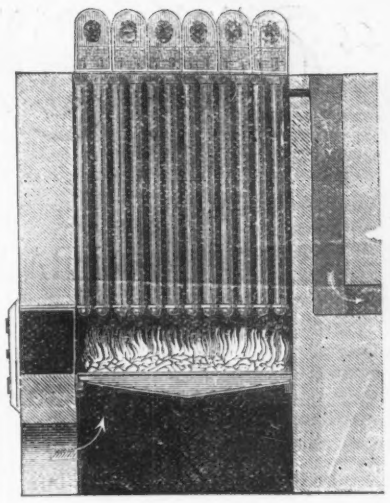

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## Table of Contents of the First Half-Volume of "The Manufacturer and Builder,"

*[ILLUSTRATED ARTICLES ARE MARKED WITH AN ASTERISK.]*

### JANUARY.


*Gold and Stock Telegraphy, .... 1
Persian Arms, Damask Steel, and Damaskeening, .... 2
How to cause a Tempest in a Teapot, .... 2
The Causes of the Difference in the Color of Bricks, .... 3
How to make different Cements, .. 3
Learned Blacksmiths, .... 3
*Dove-Tail Joints, .... 4
Wall-damp, .... 5
The Utilization of Tin Scraps, .... 6
The Firmness of Paper, .... 6
New City Buildings, .... 7
*Have you ever looked through a Microscope? .... 8
The Mechanic and his Work, .... 8
Reversible Seats, .... 9
Preventive of the Decay of Wood, .. 9
Colorado Manufactures, .... 9
Chemical Engineering, .... 10
The New Art of Fresco-Painting, 10
"Old Says" on Building, .... 11
The Progress of Building, .... 11
Chrome-Yellow Paint, .... 11
*Hints for Sign-Painters, .... 12
Imitation-Marble, .... 13
Common Mortar, .... 13
New Paint for Floors, .... 13
Apatite; Its Importance in Domestic Economy, .... 14
Gun-Cotton, .... 14
The Preservation of Wood by Immersion, .... 14
Ventilation and Heating by Currents, .... 15
Cement and Mortar of the Ancients, .... 15
Bridging the Missouri, .... 16
*The Park Bank Building—A Palace of Finance, .... 17
The Air in Lecture and School-Rooms, .... 18
Prize Problems, .... 19
Glass, .... 19
*Improvement in Saws, .... 20
Hoosac Tunnel, .... 21
*Deep-Sea Cables, .... 22
An Important Invention, .... 22
To the Public, .... 22
Trades' Unions in the United States, .... 23
Literary, .... 23
Mechanics' Homes, .... 24
*Long Island Villa, with Mansard Roof, .... 24
*Villa Cornice Work, .... 25
Children's Toys, .... 25
To the Press, .... 26
Occupations and Wages in California, .... 26
Queries, .... 27
Special Notice to Travellers, .... 27
Advertisements, .... 27


### FEBRUARY.


*Portable Wainscoting, .... 33
Ventilation and Warming, .... 34
A Few Words about Bricks, .... 35
*The Bessemer Process and its Late Improvements, .... 35
Wire-Rope, .... 37
Hollow Walls, .... 39
Rock-Drilling Machine, .... 39
Mr. Mudge on Woolen Manufactures, .... 39
*Water-Proofing Dress Goods, .... 40
Insoluble Cements, .... 40
Atmospheric Action on Building-Stones, .... 40
*Anatomy of the Screw, .... 41
Lead Pencils, .... 41
Artificial Light and the Subject of Ventilation, .... 42
Architecture and Civilization, .... 43
Arches—Old and New, .... 43
Manufacture of Sheet Tin, .... 44
Rates of Travel, .... 44
*Hand-Power Machine, .... 45
The History of Windows, .... 45
To Restore Burnt Cast-Steel, .... 45
To Bleach Palm-Oil, .... 45
The Building-Stone and Slate of Virginia, .... 46
The New-York Milling Interest, .. 47
*The New-City Post-Office, .... 48
Review of City Buildings, .... 50
Decay of Wood and Processes for Preserving it, .... 51
The Daguerrean Process, .... 51
To obtain Different Shades of Chrome-Yellow, .... 52
*Improved Cupola and Blower, .... 52
Literary, .... 54
Real Estate for Workingmen, .... 55
The Philosophy of Building, .... 55
*Villa and Cottage Architecture, 56
Consumption of Milk, .... 57
Trades and Professions, .... 58
Bread-Making, .... 58
Castle-Garden, .... 58
Queries, .... 59
Special Notice to Travellers, .... 59
Advertisements, .... 59


### MARCH.


*Brick-Making, .... 65
Absorbent Capacity of Bricks, .... 66
Lake Colors—Their Nature and Manufacture, .... 67
*Steam-Dredging and the Suez Canal, .... 68
The Selection of Wall-Paper, .... 71
*Marble Paper Manufacture, .... 71
Sand-Grinding Machine, .... 73
*The Gothic Furnace, .... 74
Ventilation and Heating by Currents, .... 74
*The Ventilation and Warming of School-Houses, .... 75
*Iron Buildings, .... 76
Hints on Economic Building, .... 78
Copper and its Alloys, .... 79
Cryolite—Where found, Nature, and Uses, .... 80
Chrome-Orange, .... 80
*Illinois State Capitol Design, .. 80
The Uses of Gun-Cotton, .... 82
Terra Cotta, .... 82
Building-Stones—Their Preservation, .... 82


### APRIL.


*Improvement in Hand-Drills, .. 97
Renovating Silk Hats, .... 97
Memoranda concerning Nails, .... 98
Comparative Weight of Pattern and Castings, .... 98
Flint-Glass, .... 98
Wolfram or Tungsten Steel, .... 99
Cheap Brick Walls, .... 99
*Stereotyping, .... 99
Edge-Tools, .... 102
Road-Dust and Vegetation, .... 102
Aniline Colors, .... 102
Soap-Making in the Olden Time, 103
*Manufacture of Vinegar, .... 104
Textile Fabrics from Glass, .... 104
The Effect of Artificial Light upon the Eyes, .... 105
*The Daguerrean Process, .... 105
Building in California, .... 105
The Piano-Forte, .... 106
The Art of Gilding, .... 106
Ventilation and Warming, .... 107
*Ventilation and Warming of School-Houses, .... 108
*The New-York Fire-Place Heater, .... 109
Cheap Houses—Building on Piles, .... 110
*The Vermont Slate Industry, .. 83
Literary, .... 86
"Too Many Irons in the Fire," .. 87
The Tinning and Silvering of Looking-Glasses, .... 87
*French Sash-Windows, .... 88
*Whence Came our Silks? .... 88
*Cottage and Villa Architecture, 89
What Shall Workingmen Read? .. 90
The Dwarf Builders, .... 90
Nature as a Builder, .... 91
Sharpening Files by Corrosion, .. 92
Queries, .... 92
Special Notices, .... 92
Advertisements, .... 92


### MAY.


*The Telephone, .... 129
Peroxide of Hydrogen for the the Hair, .... 130
The Daguerrean Process, .... 130
Glue, .... 130
How to put a Cross-cut Saw in Order, .... 131
Coraline Dye—Injurious Effects Therefrom, .... 131
Mixing Things Up, .... 131
*On Boiler Explosions, .... 132
How to Repair Chain Pumps, .. 134
New Element, .... 134
*Béton Building, .... 135
Hydraulic Mortar, .... 135
Economic Furniture, .... 111
The Manufacture of Cases for Percussion-Caps, .... 111
*The Thames Embankment, .... 112
*Automatic Indicator for Water and Steam, .... 115
*Winds and Chimney Draughts, 115
*Improved Electric Fuse, .... 116
*Stone-Breaking and Ore-Crushing, .... 117
Literary, .... 118
Are Men Equal? .... 119
Beauty in the Household, .... 119
Coöperation, .... 120
Irish Moss, .... 121
*Cottage and Villa Architecture, 121
Public Baths, .... 121
Manufacture of Brushes, .... 122
A Large Building, .... 122
To Clean Glass, .... 122
How to Make the Peasley Cement, .... 122
Polytechnic Association of the American Institute, .... 122
Manufacturer and Builder at $1.50 per year—How it is Done, 122
Large Cash Premiums, .... 123
Queries, .... 123
Shellac for Water-Proof Coatings, Dyes, Paints, and Printing Inks, .... 136
*Improvement in Billiard Tables, .... 137
Historical Notes on Paper Manufacture, .... 137
Kalsomining Walls, .... 138
A Plea for Stone, .... 138
On Forging, Hardening, and Tempering Mill-Picks, .... 139
Chrome-Yellow Paint Practically Tested, .... 138
*Water-Closets, .... 140
Welding Copper, .... 140
The Largest Suspension Bridge, 140
*Improved Hoisting Apparatus, 141
Colored Marbles, .... 141
The Piano-Forte, .... 142
Thames Embankment—South Side, .... 142
Seaweed Charcoal, .... 142
Ventilation and Warming, .... 143
The New Metal Hydrogenium, .. 144
Painting Zinc, .... 144
Artificial Alizarine for Coloring, 144
Priscian a little Scratched, .... 144
Suez Canal, .... 144
*The New State Emigrant Hospital, Ward's Island, .... 145
Magenta, .... 145
Varnishes for Iron, .... 147
Ornamental Glass—Opaline and Enamel, .... 147
Ship-Building—Here and in England, .... 147
Industrial Progress, .... 147
A New Ornamental Wood, .... 148
Sprinkling Streets with Deliquescent Salts, .... 148
*Old and New Fire-Grates, .... 148
Effect of Cold upon Tin, .... 148
Cryolite as a Source of Soda, .... 149
Literary, .... 150
Credit, .... 151
On Going Surety, .... 151
Interior Decorations, .... 151
*Church Architecture, .... 152
*Ornamental Work—Ceiling and Railing, .... 153
Purifying Water, .... 154
Adulterations, .... 154
Indelible Inks, .... 154
New Cements, .... 154
Welding Steel to Iron, .... 154
Queries, .... 155
New Advertisements, etc., .... 156


### JUNE.


*Improved Steam Pump, .... 161
What Paint shall we use? .... 162
Varnishes—their Nature and Manufacture, .... 162
Something of practical Importance in the Use of Plaster-of-Paris, .... 163
Influence of Water in the Manufacture of Wax-Leather, .... 163
Why do we Oil our Whetstones? 163
Compressed Leather, .... 163
*The Art of Electrotyping, .... 164
Practical Hints on Working and Tempering Steel, .... 166
Spiritual Photographs, .... 167
"Too Much Pork for a Shilling," 167
Credit to whom Credit, etc., .... 167
Store-Shutters, .... 168
Damp Cellars, .... 168
The Velocipede as a Mechanical Agent, .... 168
Calculating Areas by Weight, .. 168
Aniline Gray, .... 168
The Generation of Oxygen Gas from Sulphuric Acid, .... 168
*On Testing Iron by Magnetism, 169
Blowing a Wine-Glass, .... 169
How Jewelry is Made, .... 170
American Wheels, .... 170
Ventilation and Warming, .... 171
The Manufacture of Pins, .... 171
Right-Handand Left-Hand Locks 171
Lisieux and its Linen Factories, 171
Cleaning Gilded Ware, .... 171
Encaustic Tiles, .... 172
*Salt—its Manufacture and Uses, 172
Paper Belting, .... 173
Vegetable Oils—their Production and Purification, .... 174
Chimneys and Chimney-Shafts, .. 174
Artificial Stone, .... 175
Plank Walls for Cottages, .... 175
New Fact in the Behavior of Iron, .... 175
Science and Art, .... 175
*The Kansas City Bridge, .... 176
Cement to resist Red Heat and Boiling Water, .... 178
Recovery of Fatty Matter from Waste Soap-Waters, .... 179
Paper Houses, .... 179
Sodium as a Substitute for Phosphorus in Lucifer Matches, .... 180
A Plea for Iron, .... 181
To Keep Nails from Rusting, .... 181
*Wrought-Iron Arch Girder Bridge, .... 182
Liquid Fuel, .... 183
New Mode of Breaking Masses of Iron, .... 183
Utilization of Street Dust, .... 183
Literary, .... 183
How to Spoil a Husband, .... 184
Chess, .... 184
A New Alloy, .... 184
*A Country or Suburban Barn, .. 184
A New Material for Bonnets, .... 185
*Design for a Summer House, .. 185
Workingmen as Students, .... 185
Eating, .... 185
The Philosophy of a Candle, .... 186
Adulterations, .... 187
Recipes for Earthern-Ware Glazing, .... 187
Hemp, .... 187
A Poor Prospect for the Year 1900, .... 187
Setting Fence-Posts, .... 187
Queries, .... 187
New Advertisements, .... 188


The above speaks for itself. In a period of six months we gave upwards of **500 COLUMNS OF MATTER,** from the pens of the best writers in the country and presented in connection therewith upwards of **150 ENGRAVINGS!** The second half volume is equal to the first half in every respect, and it is our determination, during **1870,** to even surpass all our former efforts and make the MANUFACTURER AND BUILDER **INDISPENSABLE** to every

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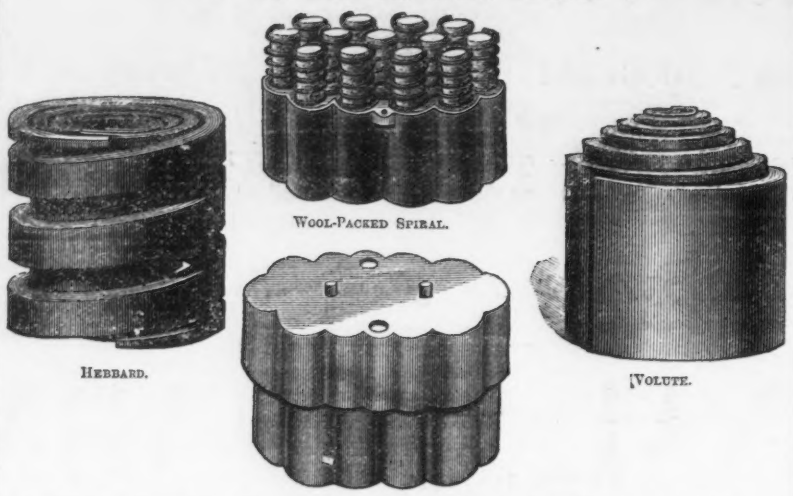

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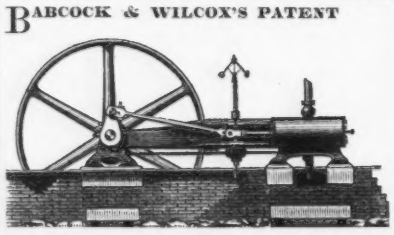

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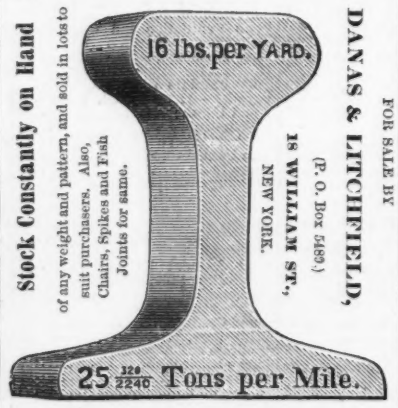


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